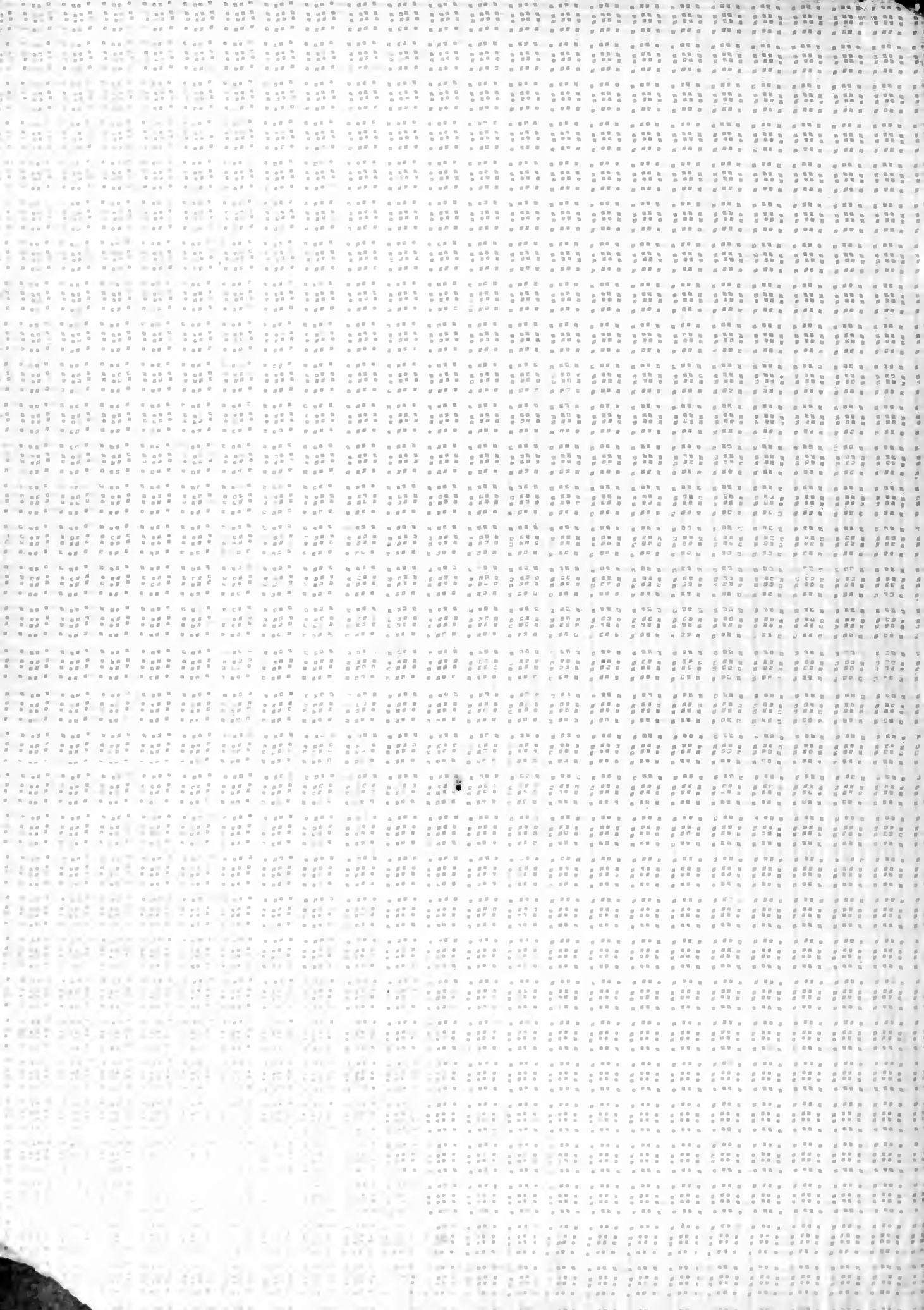
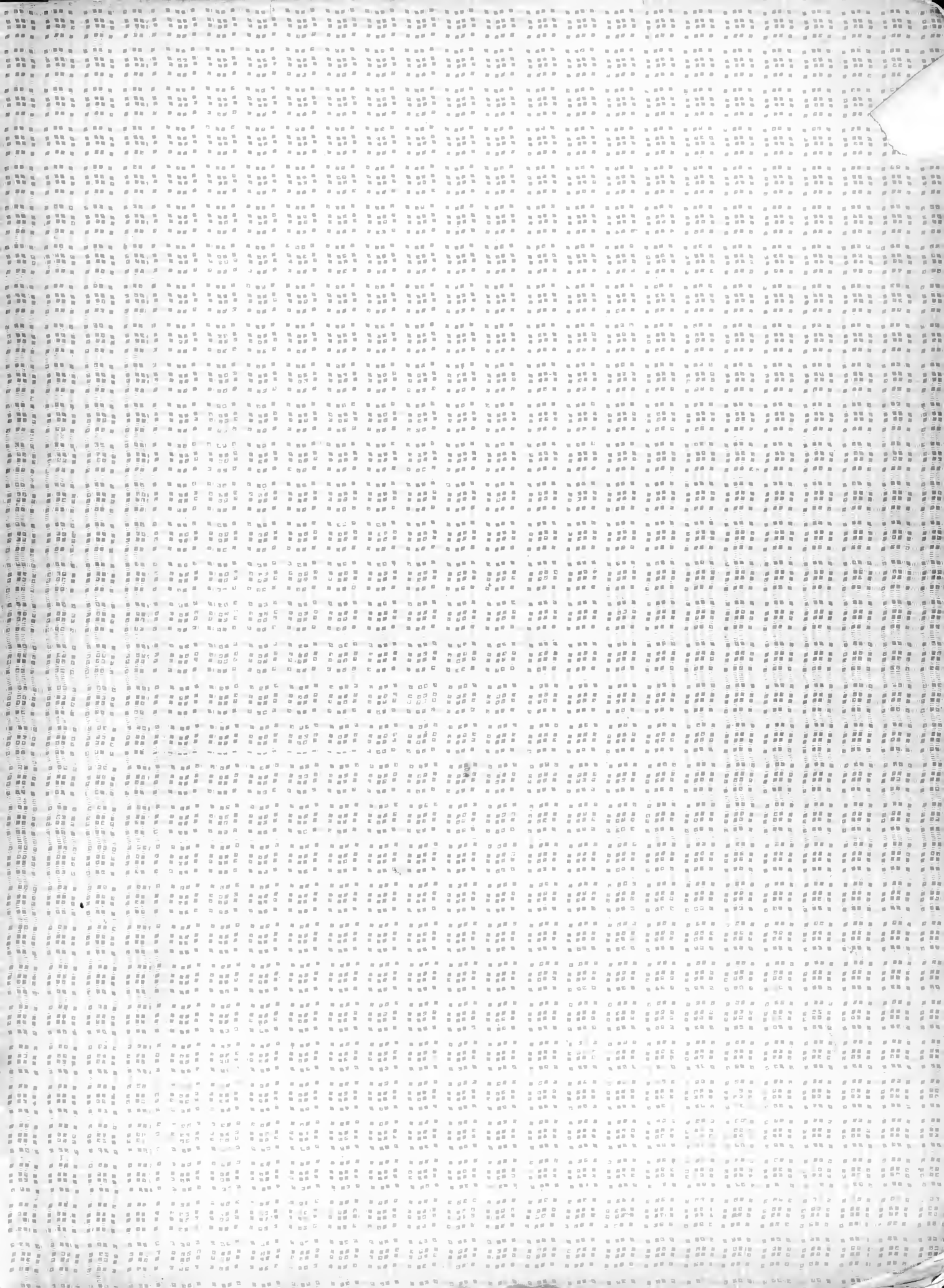


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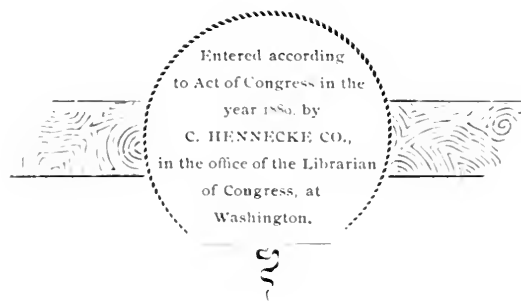
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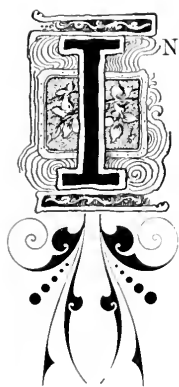
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PREFACE.

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Manual Training and Industrial Education.

BY PRINCIPAL CHAS. F. ZIMMERMANN, MILWAUKEE.

IT must be evident to the most casual observer, that great changes are going on in the social and industrial life of our people. The demands made upon each individual in order to fill his position in life creditably and with a fair prospect of success are greater now than ever before. It is not likely that this general activity and progressiveness in the commercial and industrial world will cease, consequently, the necessity for an education that is many-sided, that will equip the individual with intelligence, skill, and power to grapple with the difficult problems of life.

If we carefully examine the course of study prescribed for our common schools, we must come to the conclusion that the training provided is inadequate to the demands made upon our youth after they leave school. All the exercises in school call for the active use of the brain, to the exclusion of the physical activities. If we wish to educate rightly, we must alternate mental with physical activity from childhood up through all the years of preparation for the duties of life. Any movement, therefore, that has the improvement of our school curriculum in view, and is based upon sound psychological and pedagogical principles, should receive attention and study.

Those who have studied the progress of education in America in the last decade, must have noted with much satisfaction the gradual introduction of objective methods of teaching, and the addition of drawing and manual training to the course of study in the High Schools and grammar schools of our large cities.

Hand-work is mind-work in a higher degree than most persons are willing to admit. The success of manual training is more often dependent upon the intelligence of the individual than upon the hand. The hand can become skilful. It can become the servant of the mind. The lowest kind of work or labor need not exclude thought. It is not the unintelligent copying of a model that is aimed at, but the training of the capable hand through practice and instruction, the cultivation of a practical intelligence in the individual, that shall enable him to make a fair start in life, or prepare him for advanced instruction in some trade, industry or profession in our higher institutions of learning.

The exercises most generally recommended for introduction into our common schools, are lessons in elementary science, free-hand and geometrical drawing, modeling in

clay, the use of a few tools for simple wood-work, and the construction of paper and paste-board models. In the High School and in Manual Training Schools this training is extended to include laboratory work in chemistry and physics, mechanical and architectural drawing and shop-work in wood, iron and the metals. Each pupil is given an opportunity to combine practical illustration with theoretical instruction, so that he shall be compelled to exhibit by drawings, or work in some material whether he has grasped the correct idea which the instructor sought to convey. The character of such instruction is apt to stimulate the pupil's interest in his lessons, and incite that love for self-activity which it is the duty of the teacher to cultivate. Another gain resulting from such training is that the pupil will want to work out his own problems—will become self-reliant.

In the 100 cities where manual training has been introduced to a greater or less extent, and in the 20 Manual Training Schools in the land, the enthusiasm in favor of combining the training of hand, brain, and eye continues unabated. I have given the utterances of some of our leading educators in the following pages. Many more equally pronounced in favor of this truly objective method of teaching (mis-called manual training) could be quoted, but space forbids.

The school which has in partial operation a complete plan of instruction based on the creative method indicated above, from the Kindergarten to the High School, is the Workingman's School and Free Kindergarten, conducted under the auspices of the Society for Ethical Culture in the city of New York. Prof. Felix Adler has labored indefatigably for the last ten years to make the instruction in this school conform to rational methods and in consonance with his ideal of training the young generation for greatest usefulness. What an untold blessing it would be to the nation to have ten thousand schools of this type, and a hundred thousand teachers imbued with the true spirit of educational reform!

The Manual Training Schools are largely patterned after the Manual Training Department of the Washington University, St. Louis, under the directorship of Dr. C. M. Woodward. A description of the course of study pursued in this school is given in these pages. In the Scott Manual Training School, Toledo, and the Philadelphia Manual Training School, as well as in some others, girls receive instruction in sewing, cooking, drawing, modeling and

wood carving. The success that has attended the schools in the cities above named and in the Manual Training Schools of Chicago, Denver, Baltimore, Cleveland, New Orleans and other cities has stimulated the development of this class of schools in different parts of the country. Cincinnati is to have its Technical School, and Brooklyn has its Pratt Institute. The latter was endowed by Mr. Charles Pratt of Brooklyn, and has for its object the promotion of manual and industrial education, and to supplement this later by advanced work in science and art. Day and evening classes have been established, and the accommodations are ample for the instruction of several thousand students.

And now let us consider briefly, in how many ways such objective teaching will aid the pupil in the common school. What a flood of light is poured upon our instruction in drawing, in geometry, in natural science, if hand-work is combined with the theoretical study! The forms are modeled in clay, cut out of paper or carved in wood. The preparation of the herbarium while studying botany, the preservation of specimens while studying zoology, the representation of crystals in mineralogy by paper forms or constructions made of wire, the relief maps in the study of geography, the construction of apparatus to illustrate lessons in physics,—all this is much more interesting to the pupil and of greater educational value than the memorizing of all the facts contained in our text-books on these subjects.

The day is not far distant when the people of this land will put into operation educational reforms on a scale so grand as the world has never before seen, and when with one bound we will leap to the front in educational matters; when science, art and industry will walk hand in hand in our halls of learning, and the schools of this country will indeed be the workshops where our mechanics and artisans are trained. The products of our varied industries will then show as much taste and skill of workmanship as articles manufactured in any of the European countries. Instead of being obliged to compete with foreign manufactures, as is the case at present in nearly all the art-industries, America will take the lead, and her manufactures will be found in every part of the globe.

2. GET TO WORK AT ONCE.

"I am disposed to think that we should deal with this question of the introduction of manual education in our schools, in somewhat of a grasping spirit: that we should take all we can get, and this, as soon as possible. Not that I am anxious to hasten the complete result, viz., the universal introduction of manual instruction into our public schools, for at least, all scholars above the age of twelve; not that I am sanguine of immediate success in whatever may be to this end undertaken; not that I overlook the probability that some part of what may be at-

tempted will result in failure; but it seems to me that where so great a task is before us, the sooner we get to work, somewhere, somehow, almost anywhere, anyhow, the better. In such a case there is more waste in delay, in doing nothing, than in many mistakes made in doing something. This is not a situation to which Davy Crockett's maxim applies: first be sure you are right and then go ahead. The very thing we have to do is to make experiments, to create experience.

"We know we are right in our general principles. The best expert opinion coincides with the increasing conviction of the community, that the traditional curriculum of the schools needs to be essentially modified, through the introduction of studies and exercises which shall train eye and hand; which shall cultivate the perceptive faculties, so long and grievously neglected; which shall create a respect for manual skill and dexterity, and for taste in design; which shall afford scope and play for the creative and constructive instinct. Just what these studies and exercises shall be, in character and order of succession, is to be determined by experiment rather than by forecast. The question is one which requires to be worked out, rather than to be thought out. The most that is likely to be done in the immediate present will not be more than is needed to accumulate the experience, which shall determine the direction which our efforts in this interest shall ultimately take.

"For one, I believe that the introduction of the new studies and exercises which we are advocating will not prove a mere addition to the work of the school or college. I believe it will also profoundly modify the instruction given within the traditional line. Boys and young men who have learned to observe for themselves, to acquire knowledge at first hand, to give effect to their purposes, and a form to their ideas; who have been accustomed to impose their will upon matter, and to make it take shape to suit their intellectual conceptions; who know how to project, to plan, to execute; will have little patience with much that makes up the traditional curriculum. They will demand to be brought face to face with facts. They will insist upon going to the bottom of any matter they have to deal with. That genuine intellectual honesty, which is the first fruit of the objective study to concrete things, will make them scorn to defend, in dialectical and rhetorical practice, theses which they do not thoroughly believe. They will grudge every hour spent in memorizing matters for which they can at any time resort to the gazetteer or cyclopedia. It will be hard to impose on such students with sounding names, deceive them with sophistries, or bear them down by authority. They will care much for principles; little for the manner in which these may be dressed up for effect, or tricked out for public admiration."—*Gen. Francis A. Walker, President of Massachusetts Institute of Technology.*

3. THE INDUSTRIAL CLASSES MUST RECEIVE SUITABLE TRAINING.

"The education of the present must be shaped to suit the needs of the industrial masses, if it is to fulfill its proper function in the state. We must not close our eyes to the fact that by far the larger number of men in every civilized community are workers to whom a skilled hand is quite as important as a well-filled head. Is it not within the strictest bounds of justice and right to ask that the schools should undertake to do something for the practical necessities of these millions of men and women?

"The perfectly educated man is he whose facile hand follows obediently the clear and ready promptings of a well-developed brain. The hand is the most marvelous instrument in the world; it is the necessary complement of the mind in dealing with matter in all its varied forms. It is the hand that 'rounded Peter's dome'; it is the hand that carved those statues in marble and bronze, that painted those pictures in palace and church, which we travel into distant lands to admire; it is the hand that builds the ships which sail the sea, laden with the commerce of the world; it is the hand that constructs the machinery which moves the busy industries of this age of steam; it is the hand that enables the mind to realize in a thousand ways its highest imaginings, its profoundest reasonings, and its most practical inventions. Why, then, this disparagement of the hand in the schools? Why should not an organ which forms so vital a part of man's being receive a due share of attention in preparing him for the duties and responsibilities of citizenship? There can be no question about the harm that is done to society by this neglect. The trouble with so many departments of industry at the present moment is, that there are too few skilled artisans to put into form the ideas of the designers, that labor and thought are too far apart from each other. One reason why there is so much unrest among the working classes is, that our public education does not give them all the help they need to enable them to pursue their work successfully and happily."—*Jas. Mac Alister, Superintendent Public Schools, Philadelphia.*

4. THE STATE SHOULD PROVIDE FOR INDUSTRIAL EDUCATION.

M. J. Savage, in an article printed in the *North American Review* avers that the American public school system is trying to do too much, and as a consequence is doing very little thoroughly and well, while the things that ought to be of chief importance are certainly not accomplished. He says: "Since the state cannot, if it would, provide all its children with ideal careers, it should at least not unfit them for their actual ones. I could multiply instances of how this is actually done. Witness the crowds of working girls in the great cities, not willing to fill a position of hon-

orable service in anybody's family; none of them willing even to marry an honest man, and make a home for him, unless he can keep her in idleness, and furnish her with servants! choosing rather to jostle one another for a place behind a counter, though on starvation wages that must be eeked out even at the price of womanhood and honor. Witness the crowds of young men surrendering the home that might be earned by the 'labor' they think themselves educated 'above,' and in its place taking a garret and amusements of which they had better be ignorant; seeking for 'positions' already too full; while most of them are really not educated into the ability to do anything in particular and do it well. The first thing that any boy or girl needs, on coming into this world is to be trained into an ability to earn an honest living. This, therefore, ought to be the first concern in any scheme for common education. And since it is determined by nature and circumstances that the great majority of men and women must do some kind of manual labor, it would seem to be self-evident that any wise scheme of common education should train the hand as well as the brain. If any boy or girl is not so educated so as to be able to earn an honest living he or she is liable to become, directly or indirectly, a public charge. The state, then, has a manifest right in this matter. Thus the opportunity for an industrial education should be an internal and essential part of our common school system."

5. WHY OUR COUNTRY-BRED BOYS MAKE SUCCESSFUL MEN.

In the report by Mr. William Mather to the English Government on "Technical Education in the United States and Canada," we find the following:—

"Too large a class of young people in America, of both sexes, are seeking pursuits not requiring manual labor. Their education as given at present in the high schools and colleges, tends rather to unfit them for the active industries of life, in a country where the vast resources of nature are waiting for willing and trained hands to utilize them. The native born American hates drudgery, and all the mechanical arts when pursued without some knowledge of science to employ and interest the mind, while the hands are active, are more or less drudgery. The American boy, with his inborn ambition and natural ingenuity, would cease to regard manual labor as drudgery, if his hand and mind together were industrially trained through the school period. He would then be led into industrial employments by choice, as the readiest means to climb to a higher position in life. The farmer's boy is provided with an industrial training of the best kind in and around his home. His wits are sharpened, his perceptions developed; there is a large field for the immediate application of knowledge acquired at school on the one hand; on the other, the school exercises and lessons are more readily understood by the boy or girl having in daily

the methods of the education of boys and girls. These country schools are sources of social life as they are with agricultural schools. These occupations produce better results as a whole, even at the artisan classes, than the city schools that attend to it which is for the entire school year of forty weeks. My attention has been drawn to this fact by many employers and educationists, and it has been confirmed by my own observations. *It suggests the importance of introducing into the elementary public schools of cities some kind of industrial training.* "Our brightest boys come from the country," is a phrase which has become very familiar to me in America.

6. MAN AND LABOR AND CIVILIZATION.

Read what one of our most intelligent laymen says in his book on Manual Training.

"The disposition to undervalue the hand is an inheritance from the speculative philosophy of the ancients. Plato regarded the soul's residence in the body as an evil. The effect of this false doctrine has been the degradation of manual labor; and it is not less absurd than wicked to treat manual labor with contempt, since to it we owe all the visible results of civilization.

"Mechanics stand the test of scrutiny better than merchants: civil engineers and architects are more competent than railway managers, lawyers, judges, and legislators. Why? Because the former are educated in the world's work-shops and institutions of technical instruction; they are trained in things, while the latter have only the automatic word-training of the schools. Ninety-seven merchants in one hundred fail; lawyers and judges produce a most pitiable wreck of justice; and the statutes of legislators wear out in a year. But every locomotive that leaves the shop is perfect, bridges last a century, and the works of architects and builders stand as monuments of skill and fidelity long after their makers are turned to dust. The cause of these failures is this. Subjective mental processes (the word-training of the schools) are automatic, and hence they neither generate power nor promote rectitude. They enfeeble rather than energize the brain. Ideas and things are indissolubly connected, and a system of education which separates them is fundamentally defective. Why store the mind with facts which are not applied to things, if they are not to be applied to things? And if they are to be applied to things, why not teach the art of so applying them? The system of education that does not do this is one-sided, incomplete, unimportant. $C = \frac{1}{2} H, H = \frac{1}{2} C$."

through the eyes of some one else. They accept his thoughts. They do not draw their own conclusion, simply because they have never observed, have never learned how to weigh evidence, nor to sum up the testimony. In short, there is but little thinking, but an avalanche of memorizing.

"Practically, the whole matter of education is, in inception, growth and continuance, an institution of the state. The people at large are the ultimate source of all this power, bearing cheerfully the burdens laid upon them, and in consequence having a right to demand that the result of all this expenditure shall be in value equal to the cost."

"The pupils who are being trained in our schools now are to be the busy men and women of the next ten years. The busy hive of industry will be as full of workers then as now. The age of research, of discovery, and of invention, has just begun. The demands upon those who hold themselves out as teachers are ten-fold greater now than ever before. There is more to lead astray; there is sharper competition; there is an intense earnestness in every direction. Lines of thought are specialized as never before. The ocean of knowledge is so vast that one must be content to explore a small portion of it. There is a call for definite work, definite instruction; for a putting forth of the powers of the being in work between sharply-defined boundaries. Can we afford, longer, to carry out a system that fails to fit our children for real work?"—*T. O. Crawford, Oakland, Cal.*

8. OUR SKILLED MECHANICS ARE FOREIGNERS.

"The training which the children receive in most of our primary grammar and high schools is calculated to prepare them for commercial, professional, or literary pursuits, and next to nothing is done to direct their minds to industrial occupations. What wonder, then, that the mercantile field is over-run with applicants for places. Crowds of boys, anxious to obtain a situation in some kind of an office or a store, are annually turned out of our schools, willing to serve for almost anything; whilst in the manufactories and shops, where skilled manual labor is required, the foreign element predominates; and it is specially noticeable that the higher the grade of skill required, the more we have to depend upon foreign talent to design and execute the work. I could cite innumerable instances to verify this statement. In the General Inspector's Office of Iron-clad Steamers, a department in the Naval Construction Bureau, during our late war, were employed some twenty-five draughtsmen. Of these, six were designers of machinery and vessels, the rest copyists. Of the former, four were Germans, one Scotch and one a Frenchman, and of the others were the two-thirds were foreigners of different nationalities. In one of the largest ship and engine

building establishments in Boston, the head draughtsman was a German; foreman pattern-maker, English; boss joiner, Nova Scotian; boss boiler-maker, Scotch; blacksmith, Nova Scotian, and nearly all the best mechanics in every department foreign born. The same condition, or nearly so, is found to exist in most all large manufactories throughout the United States where skilled labor is required, especially in furniture and piano factories, stained glass and architectural iron works, potteries, house decorating, engraving and lithographic establishments, etc.

"The vast improvements in machinery, together with inventions and discoveries of new processes, have completely revolutionized every department of labor; even the farmer is turned into a half machinist or an engine tender, and should know enough about his agricultural machinery to attend to the many little repairs and adjustments necessary to keep it in proper working order; in other words, he should be not only a farmer but also a mechanic. Although the demand for skilled labor is now greater than ever, yet it is a well-known fact that we have no regular system of training boys so that they may become skilled and efficient workmen in any industrial occupation.

"It seems a little strange that such an important matter should be so lightly treated in this country, when our success in competition with foreign manufactures depends so largely upon the excellence of workmanship and originality of design. How can this be secured, but by giving our attention to the proper training of our artisans? And this must be begun in early childhood followed step by step in regular progressive order through all the grades of public schools. Unfortunately, boys are too often discouraged by their own foolish parents from cultivating a taste for industrial occupations; labor, once held honorable, has come to be regarded as degrading, and to make a living by your wits considered smartness; to borrow a dollar, invest in some speculation and pocket the margin is called business; and he who knows best how to take advantage of his fellow-men, amass a fortune while rendering no service to the world, enjoys the luxuries of life, and looks down disdainfully upon an honest workman. The fearful spread of dishonesty and corruption in business and in politics, to which we are daily witnesses, is the natural outgrowth of this diseased state in our body politic, and must be met by the strongest and most resolute combined efforts of school, church and home in order to bring back that sturdy sense of honor, industrious habits and contempt for idleness, the corner-stones upon which our forefathers raised their prosperity and success."—*Prof. Otto Fuchs, Principal Maryland Institute of Art and Design, Baltimore, Md.*

9. MANUAL TRAINING AS COMPARED WITH THE APPRENTICESHIP SYSTEM.

"I will now show that a manual training school is better than any system of apprenticeship, and hence better than any trade school.

"To the commercial method, of more or less formal apprenticeships, several very serious objections arise. First and foremost, the apprentice stops going to school. His mathematical, scientific and literary training, stop the moment he enters upon his effort to secure manual training. This fact alone ought to kill apprenticeship. It has degraded all mechanical pursuits—not simply brought them into bad repute, but has actually degraded them—and has given rise to the notion that a mechanic needs no education beyond the rudiments of the grammar school, aside from what he picks up at his trade.

"Then again, in apprenticeship at any kind of tool work, the boy is not taught drawing as a part of his trade, and yet tool work, however skilful, without drawing is the thinnest, lowest sort of apology for manual training. Not one journeyman mechanic in a hundred is as good a draughtsman, or as intelligent in reading drawings, as the graduate of a manual training school.

"Thirdly, the ordinary apprentice gets at best a very narrow kind of manual training. He is made familiar with a very limited range of work, and he is kept at that far beyond the needs of intelligent mastery, till the mechanical habits of a rapid workman are fully formed. Henceforth his handiwork is the result of habit, not of thought, and his intellectual progress as connected with his work is at an end.

"But there is a fourth argument against the commercial way of getting manual training, which, to some, may outweigh all the rest, serious as they appear to be, and that is this: To put a boy fourteen or fifteen years old to learn a trade as an apprentice is as a rule to commit him to that trade for life, without intelligent choice of occupation and with little chance for correcting a mistake if one is made. It is a crime against freedom and humanity.

"There are plenty of people whose mental make-up is such that, while they may succeed fairly in other paths of labor, they are unfit to be mechanics. They have not the ability, the proper mental qualities. To set up such people to learn trades is most unfortunate. They are sure to be low grade, indifferent workmen, always struggling against a fate, which a better knowledge of their capacities would have avoided. The fact is that, until one has had an opportunity to develop his faculties, neither he nor his teachers can tell what his 'bent' is, nor what there is in him.

"The student of the manual training school takes all his work without bias. There is no presumption either for or against a particular line of work in life. He is as

tree as it is possible to be. He probably changes his mind every year on the subject of what occupation he is best fitted for. At the end of his school course, however, he is likely to see clearly where he is strong, and where he is weak, and to direct his choice in the direction of his strength.

"I see nowhere, in either ancient or modern times, a people whose youth have been trained as our youth should be trained. Neither Babylon, nor Athens, nor Rome, with their pinnacles of culture resting on the barbarous foundation of human slavery; nor the blooded aristocracies of more modern times, buttressed and supported by millions of laborers, ground down in ignorance, poverty and superstition; none of these can teach us how to educate, construct, and adorn an American citizen. We must not expect all our boys to rule, or to be ruled; to direct, or to be directed; to employ or be employed. No narrow, selfish aim, no prejudice of caste, no false claim of high culture must mislead our pupils.

"Give them a generous, symmetrical training; open wide the avenues to success, to usefulness, to happiness, to power; and this age of scientific progress and material wealth shall be also an age of high intellectual and social progress."—*Dr. C. M. Woodward, Principal Manual Training School, St. Louis.*

10. VALUE OF TRAINED MEN.

The Massachusetts Institute of Technology has now 827 students in the school of industrial science, and 71 in the school of mechanical arts and the Lowell school of practical design. Of the value of the Institute's training, President Walker says: "Here is a case in point: The president of one of the great lines of transportation in this country—a man with a genius for organization and execution—said to me but a short time ago, that he could take a young man of good sense, good judgment and good habits, a graduate from our course in civil or mechanical engineering, and, by passing him through the successive grades of responsibility in railroad management, could in five years time make him a better general superintendent than could be made of a man lacking this preparation in twenty years. The day of half-trained men is past in this country, in all occupations—or is rapidly going past!"

11. GOOD POSITIONS FOR GRADUATES.

The president of the Rice Polytechnic Institute, during the graduating exercises, referred, with justifiable pride, to the fact that nearly all the graduates would at once enter into profitable positions. Compare the graduating classes of all the technical schools in the world with the classes graduated from the medical, legal and commercial colleges in the same period, and undoubtedly it will be found that in

the former the majority at once begin life with good positions, while in the latter many a student must expect patient waiting for more than a bare support."

In 1886 Dr. Woodward, Principal of the St. Louis Manual Training School addressed a circular to the graduates of his school for the purpose of ascertaining the results of the training they had received. The summary of occupations in which the young men were engaged at that time shows that twenty-five were students of engineering, law, and medicine; twenty-three engaged as clerks in banks, railway offices, and manufactories; ten were engaged as teachers, mostly in manual-training schools; nine as draughtsmen with architects and manufacturers; six as machinists; five as artisans; five as ranchmen and farmers; four as business men; two as engineers, civil and mechanical; two as manufacturers; one as a baker, and two whose occupation was not known. Out of the class of 1883, twenty-two out of twenty-nine are in business and the average rate of wages according to answers received was \$68 per month. Out of thirty of the class of 1881, twelve reported as earning regular wages. This average was \$78 per month. Of the class of 1885, fourteen out of the thirty-nine have been earning wages at the average rate of \$70 per month.

Dr. Woodward says: "About half the boys who attend the school get less than the whole course. For a variety of reasons they drop out. A much larger per cent. of such boys become mechanics than of the graduates. I have had many excellent reports from and concerning them, but I have not kept the reports on file."

12. A PRACTICAL EDUCATION DESCRIBED.

"But while well-meaning educators have been giving attention to manual exercises as a means of better fitting the young for a future occupation of labor, the incidental advantages have proved well worthy of consideration; for they could not fail to notice that the mind, itself, receives very material assistance when the bodily powers are, at the same time, brought under systematic development. And so it happens that not a few who at first favored handwork in school, from the utilitarian point of view, have at length come to consider it as yet more advantageous for a systematic development of the whole being, whether actual use is ever to be made of trade skill or the student is to live otherwise than by bodily labor. It is this phase of industrial education, in which hand-work appears as the auxiliary of head work, and not as the leading feature—it is this phase which most concerns us who are gathered here, whose life-work is not to guide pupils in the narrow channels of special callings; but to make them intelligent, virtuous and useful citizens. . . .

"In studying the sciences, facts must be gathered in and digested and assimilated, and all this cannot be done by the hearing of the ear, by the study of books, or attend-

ance at lectures. It is getting to be better and better understood that the student must put himself in the attitude of an observer and investigator. He must see with his own eyes, and feel with his own hands. He must use his bodily senses as well as his intellectual faculties. And he must bring to his aid the various instruments which the rigorous demands of science have caused to be invented. And thus it comes that our higher institutions of learning must have their well-equipped laboratories of chemistry, and physics, and biology, and their collections of illustrative specimens in mineralogy, and botany, and zoology, and even in technology. The student of medicine must himself dissect the human body and frequent the hospitals. The student of physiology must himself use the scalpel and microscope. The student of engineering must himself work with level and transit. The student of astronomy must learn with instruments what is meant by right ascension and declination. The student of mechanics must himself measure velocity and resistance, and test the strength of materials. Laboratory teaching and laboratory work is getting to be the prominent feature of schools of science, and a not altogether subordinate one in the colleges of liberal arts. And yet with the present subdivision of professional labor, the physician may never ply the knife among living muscles and arteries and nerves, and the chemist may never have occasion, in after life, to make an analysis. Then why require superfluous work of the young aspirant? Because ideas that come through the hand and the eye come to stay. Because touch and sight correct the crude perceptions of the mind; because direct observation shows more in a moment than whole pages of words can set forth. And now as hand practice is proving so valuable in the higher schools, the question comes up whether in the elementary schools also the direct sources of knowledge shall not be trained, instead of exercising memory alone. The most marvelous instruments that ever were made, are the eye and that culmination of contrivance, the human hand. Think of this much articulated member with its manifold executive powers. Think of those thousands of nerve loops in the finger tips, which bring the brain and mind into contact with the outer world. With the hand we become cognizant of the hard and soft, smooth and rough, sticky and slippery, even and uneven, sharp and dull, rigid and flexible, hollow and solid, thick and thin, wet and dry, warm and cold, heavy and light, strong and fragile. With this we take our food, with this we fashion our garments, with this we build our houses, with this we create forms of beauty, with this we transmit our thoughts. These are eyes to the blind and speech to the dumb. Shall the schoolmaster continue to exercise in writing only, this member on which the Creator has lavished so much skill? We have gymnastics, to be sure, to give strength and suppleness to the body; but, except in quickness of catch,

and firmness of grip, gymnastics leave the hand untrained.

"The school should start the child aright, guide him in the right direction, and economize his strength. The aim should be, not to turn out pedants or narrow specialists, either of high or low degree, but to develop all the powers systematically and make intelligent, capable, self-directing men and women. And whatever pursuits give the best mental and physical discipline, are most worthy of a place in the course of instruction. Order, exactness, neatness, love of beauty, and inventiveness are desirable in all. In reading, the pupil may think he does pretty well if he pronounces most of the words rightly. In writing, he is satisfied if the letters are not quite all of a height, and their forms are only a little remote from the copy set. But in making a dove-tailed wooden box, hasty measurements and rude approximations will not answer. Ill-matching joints bring on one the laugh of his fellows and his own self-condemnation. Exactness is seen clearly to be the artisans first law. The boy may be tolerated in translating Greek or German into limping English; but when he tries to smooth a board with a notched plane, he is forcibly reminded that the tool must be ground. The discipline of fitting things is far more effective than that of shaping letters, or arranging words. The pupil's patience breaks down when he tries over and over again to do the elusive sum in arithmetic, but he is so delighted to use his hands that he is not disheartened by repeated trials till the joints are neat and true.

"We must look out for a practical education suitable for the great mass of boys and girls. Let it combine the kindergarten and the primary school, the slojd school and the common school. Let it include finger plays and object lessons for the little ones, hand-work for the middle school, drawing, modeling and manual training in the more advanced schools, and, for as many as can go farther, the physical, chemical and biological manipulations of the scientific schools and colleges. So shall we at length succeed in bringing up a race of true men and women with trained muscle, trained mind, and executive power." —*Dr. John M. Oedway, Principal Manual Training School, Tulane University, New Orleans.*

13. BENEFITS RESULTING FROM THE INTRODUCTION OF THE ELEMENTS OF PHYSICS AND MECHANICS INTO OUR COMMON SCHOOLS.

"The purpose sought by the advocates of so-called industrial education is the training of the eye and the hand of the pupil, and his acquisition of those elementary principles of physics and mechanics which underlie all dealing with the forces of nature and with material objects.

"Beginning with the pupil at the stage when kindergarten methods and appliances are exhausted of their

efficiency, the scholar should be instructed in the elementary principles of physics and mechanics through the use of simple models and apparatus, and should become familiarized through frequent statement and illustration with the fundamental conceptions of geometry. There is a deep-seated popular error as to the age at which such things as the above can advantageously be acquired. It is too often assumed that because the young child is not competent to study geometry systematically he need be taught nothing geometrical; that because it would be foolish to present to him physics and mechanics as sciences it is useless to present to him any physical or mechanical principles, &c. &c. &c.

"A child of ten or twelve years is capable of understanding the principle of the lever just as perfectly as did Archimedes of Old Syracuse. Once implant that conception in his mind and it becomes germinal, and, without watering or tending, will bear fruit perennially through all his life.

"A child of the same age can comprehend the principle of the arch, when illustrated by a few blocks from a carpenter's shop, as fully as does the architect who hangs a stone dome 100 feet in the air; and when he has once comprehended all the construction and office of the arch, his eye will never thereafter fall unintelligently upon an example of it. A child of the same age is capable of comprehending the law of perspective. Why in the name of common sense should one go on for years, walking through our streets or over the fields, his eye falling at every glance upon some object which is subject to the law, and yet never be instructed regarding it?"

"Do you ask how much of the elements of physics and mechanics should be given to the child of tender years? I answer, just as much as he will take, be the same more or less. And it is always safe to offer him a little more than he will take. It can't do him any harm. Cramming him with hard and lumpy facts from so-called geographies or histories, may produce mental indigestion or colic; but an idea, an apprehended principle, never yet hurt a human being, and never will to the latest syllable of recorded time. For myself, I would not stop short of teaching a child the doctrine of the persistence of force through all its transmutations. Doubtless he would at first fail to apprehend it fully; yet he would gather some thing from it, in rather picturesque enunciation; and, as the proper effect would be familiar to his ear, and as illustration of the *conservation of motion*, heat, light, and sound were manifest to his eyes, in which I should hope that he would be able to see, as he grew, and appreciation of the *conservation of energy* would be a natural consequence."

acquire an habitual, and in time, instinctive disposition to trace effects to their causes, if these things be among the prime objects of education, comparison may be challenged between the matter of study that has been described and the work that now takes up two-thirds of the time of the scholar of the age we have been considering. *Secondly*, That if the direct usefulness of the information acquired be adopted as the test of different systems of instruction, the elements of geometry, physics, and mechanics have preference, in an enormous degree, over the traditional studies of the primary and grammar schools. But, *thirdly*, that the main argument for the early acquisition of these elements is to be found in their usefulness as a preparation for the study of geometry, physics, and applied mechanics in later years.

The consideration which weighs more than any other, in my mind, is that the introduction of shop-work into the public schools, closely affiliated with exercise in drawing and design, will give a place, where now there is no place at all, or only a most uncomfortable one, to those boys who are strong in perception, apt in manipulation, and correct in the interpretation of phenomena, but who are not good at memorizing or rehearsing the opinions and statements of others, or who, by diffidence, slowness of speech, or awkwardness of mental conformation, are unfitted for intellectual gymnastics. It is mighty little which the ordinary grammar or high school does at present for scholars of these classes. Not only do they at the best, get little personal pleasure from their work, and receive little of the commendation of the teacher, but, in the great majority of cases, they are written down block-heads, at the start, and have their whole school-life turned to bitterness and shame. And yet it not infrequently happens that the boy who is so regarded because he cannot master an artificial system of grammatical analysis, isn't worth a cent for giving a list of the kings of England, doesn't know and doesn't care what are the principal productions of Borneo, has a better pair of eyes, a better pair of hands, and, even by the standards of the merchant, the manufacturer, and the railroad president, a better head, than his teacher.

"The introduction of practice in the mechanic arts would strike a responsive chord in the hearts of all boys of the class I have so inadequately described; it would at once give them something to do in which they could excel; it would quicken their interest in the school; it would save their self-respect; to many of them it would open a door into a practical life."—*Gives Place* in *A. Waller, Possible but Misunderstood: A Study of Technology*.

11 WHAT CAN BE ACHIEVED IN OUR COMMON SCHOOLS?

" Having made this subject a special study for the last fifteen years, I have tried to find out the best method of combining industrial and intellectual training in the lower

as well as higher grades of schools, and I have arrived at the following conclusions :—

"First. All children should be made as familiar as possible with the language and the common terms used in the common employments of life.

"Second. They should be trained experimentally, and practically to a certain extent, in the elementary principles of these common employments, in order to secure for them a correct understanding of their nature and demands, and also a proper regard and a mental sympathy for the representatives of capital and labor—or for the so-called professions and common employments—so that every necessary employment shall be considered equally honorable and respectable.

"Third. The manual part of this training should be of the simplest kind in our elementary schools, and should be given with the simplest tools and machinery, and with as little expense as possible. Some of the most formidable objections to its introduction arise from the heavy and needless expense and cumbersome machinery which have hitherto been considered necessary. It can easily be demonstrated that the most important educational features of industrial and manual training can be secured with simple and inexpensive machinery and tools.

"Fourth. This training should be wisely adapted to all pupils alike, and brought within their reach; especially of the largest number, belonging to the middle and poorer classes, who most need it.

"Fifth. While all needed industrial training is to be secured, it should not be allowed to interfere with such intellectual training as every child should receive, but it should rather serve to make that training more effectual and complete. For no education is complete which does not primarily develop and train the mind and the heart.

"While evidently it would generally be better to have a specifically prepared room for industrial work, yet as the child under ten or twelve years should be mainly confined to the acquisition of the most elementary principles, to the meaning and use of the language and common terms used in the common employments of life, one and the same room and the same teacher, if properly qualified for each grade, may be employed for the first four or five years.

"As soon as the elementary course of industrial training, (for this training should be carefully graded upon natural and progressive principles), and it becomes necessary to use such heavy apparatus, tools, and machinery as cannot be well introduced into the school-room above described, it will be necessary to provide a special industrial room, in which the most appropriate, but simple, tools and machinery may be used regularly, but alternately with the necessary intellectual exercises. But it must be continually born in mind that both industrial and intellectual

training in our public schools should be regarded and used as means of such an education as will be preparatory to some future employment or profession, and not for the specific purpose of teaching trades or for the acquisition of book-knowledge. All preliminary school-training should be so conducted as to furnish such a preparation as is needed by all alike who expect to follow any trade or profession.

"When this preparatory training is completed, after leaving the high school or college, then our pupils should enter the trade and professional schools, where they can enjoy enlarged opportunities to fit themselves, theoretically and practically, for their chosen life-employment."—*Zalmon Richards, Washington, D. C.*

15. MANUAL TRAINING INTRODUCED IN ALL THE GRADES.

"A discussion and application of the principles, methods and value of manual training was begun in this school nearly six years ago. Four rooms in the school are now devoted to handwork. One is used for clay and wax modeling; another for paste-board work and wood carving; the third for woodwork and the fourth to the making of relief maps. The hand work is done by all grades whenever and wherever it is needed to assist in the development of a subject. Much independent work is done by pupils outside of school hours. The financial means are limited, the teachers lack training and the methods are crude. The results, however, under these unfavorable circumstances, prove that hand work trains children to love work, to be cleanly, orderly and systematic. They prove that hand-work lies at the basis of logical reasoning and clear thinking; that making with the hands is organically connected with all other branches of study, and without it the harmonious development of body, mind and soul is an impossibility. Manual training is intrenched in the soundest psychology; it finds its most cogent support in the philosophy of history, and its noblest use in the needs of humanity. It has come to stay *if trained teachers can be found to keep it.*"—*Francis W. Parker, Principal Cook County Normal School.*

16. COURSE OF STUDY FOR A MANUAL TRAINING SCHOOL OUTLINED.

"Turning, then, to the relation which the manual-training sustains to the technical school, let me for a moment consider its curriculum. It must evidently give a thorough training in the lower mathematics—arithmetic, algebra, plane and solid geometry. There will be abundant opportunity to use the facts and methods of arithmetic and geometry in the shops and drawing-room; but no familiarity with the facts, no faculty in instrumental drawing, should obscure the value of purely geometrical reasoning. Algebra is rarely applied unless one needs its methods in higher physics, mechanics, and astronomy. As a rule, not one student in five goes far enough in mathematics, pure and applied, to make an intelligent use of his algebra:

nevertheless, his knowledge of its elementary methods must be full and clear.

"The elements of botany, chemistry, and physics, including at least their phenomenal sides, and some of the more obvious generalizations, should be thoroughly studied during the course at the manual; but in every case the laboratory method should be used. Generalizations made by an author for which no sufficient evidence is presented to the student, are of no educational value. They are like assertions in history, or geography, which are to be taken on faith. Real objects, personal experiments and tests—I care not how familiar they may be to the teachers—must give the student his basis for judgment and generalizations. Above all, I would advise teachers to avoid putting their elementary students at really new work; at strictly original research. All the ground should be familiar to the teacher, and, though the pupil approaches it as a learner—as a discoverer of new truth—the teacher should, as a rule, know what he ought to find. I have no patience with premature researches and childish inventions. I am inclined to think that chemistry is easier to teach in a laboratory than physics, on account of the latter's great demand for skill in manipulation and construction in the physical laboratory. One must be somewhat familiar with all work in woods and metals in order to properly study physics. In future, we shall put our study of heat, electricity, sound and light, after the study of chemistry, in order to give time for the tool-training needed.

"In a technical school, students have little time for history and literature; hence both should come systematically into the preliminary or manual-training school. The students are old enough to appreciate something of style, and to tell good writing from bad. By conscious imitation of good writers, they really learn to say things clearly, to use language accurately when they know what the thought is which they are to express; and they can easily master the simple mechanical details of composition. American and English history, and possibly some general European history, should be learned early, and always with a certain amount of geographical study.

"No technical student should be ignorant of the elements of Latin, and a fair reading command of at least one modern language in addition to his own. No study of words is so fruitful in clear analysis and a high appreciation of the importance of slight changes of form, of endings, and auxiliaries, as that of Latin. It matters comparatively little whether the student remembers in after years the vocabulary, or the exact forms of Latin verbs—the important thing is that he will never look upon any language without feeling the influence of his Latin study. Either French, German, or Spanish, should be seriously taught at least one year before entering the technical school.

"Experience has shown that the drawing course can be carried much farther in the preparatory schools than was formerly supposed possible. In the first place, they readily master orthographic and isometric projections, and employ them naturally in both freehand and instrumental work. They rapidly become expert in the use of T square, triangles, drawing-pen and brush, using India ink or colors. Accuracy, clearness and finish are acquired by systematic study of elements, and there is no lack of interest, though picture-making is very rarely indulged in. A certain number of very instructive drawings must be made by each student to illustrate abstract principles and to represent ideal forms; but in all cases where it is possible to draw from objects, objects only should be used.

"In the selection of objects, great care should be taken to find simple ones, and yet a wide variety. Pupils are rarely fit to make their own selections. Some of the elementary principles of descriptive geometry may be introduced. With the exception of a little conventional perspective, so-called, I would leave perspective for the technical school.

"The elements of tool-work in woods and metals I regard as eminently appropriate to the educational work in the manual-training school. It is admirably fitted to meet the physical, mental, and moral natures of all healthy boys from the age of thirteen to eighteen. I make this statement without any reservation whatever. I am speaking now about manual-training schools, but were I talking about classical schools which do not have tool-work in their course of study, I should say the same thing; nay, I think, I should say it with greater emphasis in reference to those classical schools which afford so little opportunity for dealing with the concrete and forgetting primitive notions of the laws and properties of matter and force."—*Dr. C. M. Woodward, Principal Manual Training School, Washington University, St. Louis, Mo.*

17. MANUAL TRAINING IN PUBLIC SCHOOLS A SUCCESS.

H. W. Compton, Superintendent of the Public Schools of Toledo, Ohio, gives an account of the successful work accomplished in the Manual Training School at that place in the following language:—

"The manual-training work began in a humble way in a small room, with sixty boys and girls in the classes. These were pupils of the public schools, and did their regular work in connection with free-hand and mechanical drawing, and carpentry in the manual department. The school began to make friends of its enemies. Those who had indulged in hostile criticism of the enterprise, gradually grew silent. The second year a large four-story brick building was erected, and equipped with steam power, benches, tools, lathes, forges. Ample room was provided for free hand and mechanical drawing, special prominence being given to architectural and perspective work. A domestic economy department was added, in which girls

study the chemistry of foods and their preparation for the table. A Sewing class has been organized, in which the cutting and fitting of garments is taught. A class in clay-modeling mold the forms and designs used in the arts. The students have increased to about three hundred in all departments, and from the beginning have manifested the greatest interest and enthusiasm for the work. This intense interest in the new work had at first to be so modified as not to interfere with the regular prosecution of the intellectual or class-room work proper. After some experimenting, the two lines of work were harmoniously adjusted to each other. Boys and girls pass from their algebra and history to their drawing, wood-carving, or clay modeling, and from these again to geometry and English literature, with a hearty zest for all. The girls in the domestic economy department con their Vergils or don their cooking suits, and prepare with ease and grace such savory and palatable food as would mollify the most radical opponent of industrial training. In short, there is such a harmonious blending of the useful and the practical with the higher intellectual culture, that the unprejudiced needs but to inspect the work to be convinced of the reasonableness and great utility of such training. The advantages of the manual department are open to none except pupils of the public schools. Those who take the manual work do the same amount of mental work in the regular class-room studies as those who have no work in the industrial department

"Manual training is a successful and satisfactory branch of study in the Toledo schools, not because it is theoretically a good thing, nor because it is given undue prominence and special advantages, but because it is in harmony with the nature of things, has a noble purpose in view, has been well managed, has good instructors, and has proved itself of great value to the pupils."

18. THE ECONOMIC SIDE OF MANUAL TRAINING.

"I believe the work shops of manual training have a pedagogic and an economic value: that the economic side of that work is that it should enable the person who had done it to do better work, to bring out better results, to accomplish something in the way of getting his livelihood; and that the pedagogic side is to do something towards making him a larger and nobler, more perfect and more complete man. Undoubtedly this question of manual instruction has its utility on both these sides. There cannot be anything in the way of instruction, anything in the way of training or discipline, which shall not have its pedagogic value. Yet it appears to me that the chief value of this manual training belongs on its economic side, and I am disposed to protest right here against the assertion that is sometimes made that they do not care to discuss the economic side, that will have nothing to do with this. I believe the time is rapidly coming, and we

are being forced to it by the circumstances round about us, when young men and young women must get in schools their instruction in trades, because there will be no other possible way in which they may get that instruction; and that boys and girls will come out of those institutions ready to earn their daily bread. I cannot see how this is to be got at entirely except through education."—*Dr. Selim H. Peabody, President Illinois University.*

19. NECESSITY FOR TECHNICAL SCHOOLS.

"One of the things well settled is that we are to have a great multitude of schools for instruction in the arts, of various grades and peculiarities. Those who object to anything more, to reaching the children of the people more widely, concede that this, at least, is coming. The necessities of diverse manufacturing industries, the trend of production and trade, the pressure of domestic commerce, the competition of foreign skilled labor, trained in such schools abroad, all make this inevitable. We cannot now hold our own among civilized and productive nations without it.

"Everyone can see that departments in colleges and universities linking the education of the hand with established courses of higher instruction are multiplying, and that no departments are to multiply faster, though independent institutions for the same end may outstrip them. Municipalities lying near to great stores of raw material and of coal will ere-long be obliged to multiply these; the enterprise of business men and manufacturers in such marts of produce as Kansas City, Omaha, and Minneapolis, will emulate the example of those of Chicago; the division of labor going on so fast, and the distribution of specific trades, each with its own technique, will originate other schools, like and unlike, in smaller centres. We shall have towns like Chemnitz in Saxony, with a half a million of dollars of property in Higher Technical, Foremen's, Builder's, Machine, Drawing, Weaving, Hosiery, Agricultural, Tailors', and "Fort-bildung" Schools—the work of 100,000 persons within the city connected with that of twice the number without, and all other types of education on a par with that which prepares for the university. In all these schools for direct instruction in the arts the principle must be differentiation, to a degree which is not possible in general education, lower or higher, though this must be less and less independent of it. Even our high schools cannot now be run in one mould. The useful art institutes of various regions, and even of the same region, must needs differ. Generous men, too, are quite as likely to follow the example of Purdue and Case and Rose as those of the great names whose munificence has made the older colleges powerful, and each to have a technological scheme of his own which his wealth shall carry out."—*Dr. George F. Magoun, President Iowa College.*

ART EDUCATION.

BY CHAS. F. ZIMMERMANN.

THE foregoing testimony to the value and necessity of manual training and industrial education should inspire our educators and friends of a rational education to introduce such changes into our schools, as will make the training given to our youth more practical, and more in accordance with the demands of the present. Better methods of instruction in the branches taught in our schools and a limitation of the time now devoted to them are demanded to make room for teaching elementary science, drawing, modeling and simple wood-work. The same course of training that will cause the pupil to observe nature accurately, and fix these facts indelibly in his mind; that will cause him to reason and draw correct conclusions from his observations, are as necessary in artistic as in scientific training; and when the hand performs its part, habitually recording these observations by means of writing, drawing and modeling, we have laid the foundation for a rational development of the mind. If this change is to be effected, it must be through our teachers, who should take the initiatory steps, securing these benefits to themselves. Teachers should be close students of nature, logical reasoners, and skilled in the use of the pen, pencil and modeling tool. From the primary teacher to the university professor, all will find this power, this skill indispensable in making their acquisitions, in their researches, and in their teaching.

While our common schools provide for an elementary course in drawing, provision for a thorough art education should be made in all our training schools for teachers, in our art schools, in technical schools and through museums of fine and industrial art. Ample provision must be made for all whose work in life demands artistic training. And if we are to succeed in interesting our people in this general art education, we must encourage the technical side of art first the application of art to industry. But this national art training must have attained a certain degree of development before we can look for any very marked results, and raised up a class of creative artists and designers who will give to our products character and value. Every important manufacturing center will then become an art center, and the people, so gradually educated in taste to appreciate the need for, and the need for it. This will tend to give us the artistic training we need for our own sake. It is necessary that we should have a general movement for the art education of our people, which will be the introduction of art into the public mind. It has been

followed up by the establishment of art schools in all parts of the land. The foundations of three Museums of art have been laid. There are art collections in connection with most of our Art Schools, and others in Galleries independent of schools. The Museums (to which Art Schools are attached) are, the Metropolitan Museum of New York, the Pennsylvania Museum of Philadelphia, and the Boston Museum of Fine Arts. Art Schools are located in San Francisco, New Haven, Urbana, Baltimore, Boston, St. Louis, New York, Syracuse, Cincinnati, Philadelphia, Pittsburgh, Milwaukee, Chicago, Providence, Columbus, Detroit, and Art classes are to be found in many of our colleges and higher institutions of learning.

There is no doubt that the opportunities afforded our youth will develop certain national characteristics. At present American art reflects the external conditions of American life. The idea of self-interest has so far been more efficacious in developing American art, than the love of the beautiful. It is founded on the desire to make money. Art students who have attended these schools urged by the prospect of earning something immediately upon the completion of their course, have gone into good industrial-art positions and nearly always succeeded, while those who have attended with a view of establishing themselves as professional artists have not done near so well. In time, as opportunities for thorough training grow larger, we shall produce admirable results. But it is certain that it takes two or three generations of culture and study to produce a high class of artists.

The system of technical art training for women in America is, without doubt, the best and most thorough in the world. Woman's work in this line has been quite successful, though as a professional artist she has failed to assert herself.

While Art Schools will develop in all large centers, it will be necessary to the highest development of art in America to create a National Art School, or Art University, with its Museum of Fine and Industrial Art. I have quoted in the following pages from artists and teachers known to the general public, and trust that the hope expressed may be realized in the near future.

2. WHO IS LIKELY TO ENDOW A NATIONAL ART SCHOOL.

"It is doubtful whether our government can ever be induced to establish a National Art School of a high order, that will compare as favorably with European Art Schools, as the first of our colleges and universities do with theirs;

and since such institutions cannot be made self-supporting, the only hope remains, that some one or more of our wealthy merchant princes, who have sufficient appreciation and taste for art to invest large sums of money in private collections, come forward and donate the same, together with sufficient means to found a National Art School and Museum that will do for this country what South Kensington has done for England, Paris for France, Dusseldorf and Munich for Germany, Rome and Florence for Italy. When this is done, then, and not until then, shall we cease to hear of the necessity of importing skilled workmen for our art industries, and silence also the remaining few of our leaders in education who, for some unaccountable reason, do all they can to check the progress of this new feature in our educational system."—*Prof. Otto Fuchs, Principal Maryland Institute Schools of Art and Design.*

3. WHY WE NEED A MUSEUM.

W. Martin Conway in the *Magazine of Art*, writes thus of the value of a museum:—

"The position which a library takes to the student of history or literature is occupied by a museum in the case of the student of art. Whether his object be to trace the development from age to age and from country to country of the artistic spirit which is planted in all mankind, or whether he himself desire to take up a position in the ranks of the army of laborers in the field of production, he is alike compelled to fall back for counsel, for warning and for teaching on the works of others gone before."

4. THE GREAT INDUSTRIAL-ART MUSEUM AT VIENNA.

We give the following extracts from his description of the great Industrial Art Museum at Vienna:—

"The Austrian Museum belongs to the technical class; its object is technical as opposed to classical education; its methods are practical rather than theoretical or historical. The most prominent feature in the classification of the collections is, as will be supposed, the division according to nature. The principal classes are: works in the precious metals, in the baser metals, in clay, in glass, works of textile art, furniture, wood carving, sculpture, and miscellaneous. . . .

"On the principle that 'the museum is not intended to satisfy the foolish love of sight seeing (*soll nicht die müssige Schaulust befriedigen*),' the first thing was to spread abroad a correct conception of its real objects, and to enlist the sympathies not only of the producing, but of the purchasing public. With this end in view, public courses of lectures were delivered on various subjects connected with art, and the crowds which flocked to hear them proved that they satisfied a want previously unrecognized. . . . No less important for students are the valuable collections

of first rate productions—photographic, galvano-plastic, and other—which are kept for sale in the museum at a cheap rate. . . .

5. VALUE OF EXHIBITIONS.

"During the summer of 1881 no less than three exhibitions were held: the first of works of photographic art of all kinds; the second of glass and pottery; and the third of paintings, carvings and other objects. These perform a three-fold function. They act educationally, enabling the student, by the assistance of the valuable catalogue specially prepared for each, to become acquainted with the various branches of individual art; they kindle a wholesome competition among exhibitors; and they bring the public constantly face to face with the best producers, and enable them to judge for themselves of the relative merits of this or the other manufacturer, whether famous or less famed. Thus they do away with much of the need of advertising, which is one of the curses of modern civilization. In the case of such an exhibition as that of pottery, all the objects are for sale on the spot at fixed prices. . . .

6. TECHNICAL ART SCHOOLS IN AUSTRIA.

"If the best way to raise the taste of the public at the present day has been shown by experience to be that of exhibitions, such have by no means done away with the necessity of schools for the training of workmen in the more refined methods of production. Such schools have been established under the inspection of the Austrian Museum in all parts of the land—schools of drawing at Haida, and Steinschoenau, and many other places; schools of wood carving in the Tyrol at St. Ulrich, Hallein and elsewhere; a school of porcelain work at Elbogen; schools of embroidery, masonry, goldsmith's work, etc., in different parts of Vienna. The object in each case is to direct and develop a taste already manifested by the inhabitants of the particular locality, and thus to increase their happiness and prosperity.

"Naturally, however, the whole strength of the museum organization is thrown into the high school of technical art, which is held within its walls. It is under the governance of the Director of the museum, three of the curators and a member of the Chamber of Commerce. The school is divided into four parts, which deal respectively with architecture, sculpture, decorative painting, and figure painting, all primarily in their relation to art-industries. There is, further, an introductory school of drawing. In addition to practical teaching in the handling of colors and tools, there are also courses of theoretical study devoted to such subjects as perspective, the theory of style, the anatomy of men and animals, the theory and chemistry of colors, the history of art, artistic mythology, and so forth."

7. WASTE OF TIME AND TALENT FOR WANT OF A MUSEUM.

Sir Joshua Reynolds, speaking of the value of an Academy, says:—

"The principal advantage of an Academy is, that, besides furnishing able men to direct the student, it will be a repository for the great examples of the Art. These are the materials on which genius is to work, and without which the strongest intellect may be fruitlessly or deviously employed. By studying these authentic models, that idea of excellence, which is the result of the accumulated experience of past ages, may be at once acquired; and the tardy and obstructed progress of our predecessors may teach us a shorter and easier way. The student receives, at one glance, the principles which many artists have spent their whole lives in ascertaining; and, satisfied with their effect, is spared the painful investigation by which they came to be known and fixed. How many men of great natural abilities have been lost to this nation for want of these advantages! They never had an opportunity of seeing those masterly efforts of genius, which at once kindle the whole soul, and force it into sudden and irresistible approbation.

"Raphael, it is true, had not the advantage of studying in an Academy; but all Rome, and the works of Michel Angelo in particular, were to him an Academy. On the sight of the Capella Sistina, he immediately, from a dry, gothic, and even insipid manner, which attends to the minute accidental discriminations of particular and individual objects, assumed that grand style of painting, which improves partial representations by the general and invariable ideas of nature.

"Every seminary of learning may be said to be surrounded with an atmosphere of floating knowledge, where every mind may imbibe somewhat congenial to its own original conceptions. Knowledge, thus obtained, has always something more popular and useful than that which is forced upon the mind by private precepts or solitary meditations. Besides, it is generally found that a youth more easily receives instruction from the companions of his studies whose minds are nearly on a level with his own, than from those who are much his superiors; and it is from his equals only that he catches the fire of emulation."

8. FACILITIES FOR STUDY OF ART IN NEW YORK INSUFFICIENT.

As to the facilities of public facilities are concerned, the most of them which could be pursued at all in New York. The only one which is open to the student, it does not seem to me, is the Academy of Design, on the subject of which I have written a paper, and which is now in the Astor Library. The only other one which is open to the student is the Academy of Design, which is now in the Astor Library.

with great courtesy to students, and the Society Library (at least this has been our own experience) amiably waives its rules and regulations for the moment on the presentation of proper credentials. But neither Library makes any pretension to completeness or even to great fullness in its art-department, and such as these are, they consist entirely of books, chiefly books of engravings. Under the able direction of Professor William R. Ware, the library of Columbia College has been enriched, as we understand, with an important collection of architectural photographs, which is all the time being added to. Those who remember the collection of photographs which Mr. Ware made for the Architectural Department of the Institute of Technology in Boston, while that Department was so fortunate as to have him at its head, will need no assurance of the value of the work he is doing in his place in Columbia College; but the collection which he is making there, although we have no doubt it is open, so far as is possible, to all who can show a good claim to its use, is still a private collection; beside that it is confined to one subject, and does not at all meet the need we are concerned with.

"Let us suppose the case of a class of young people formed here in New York, for the purpose of study in some one of the divisions of the broad field of art. As has been said, there is no museum where they can go to see examples of what has been done in that field; there is no library where they can find prints or photographs, and even the illustrated books belong, for the most part, to the ornamental rather than to the useful sort. If the class were formed in London, it would not be necessary for the members to expend a penny for the illustrations of their subject, they would simply meet at the British Museum, or at the National Gallery, or at the South Kensington Museum, and there make their observations, and take their notes. It is common to read, in the advertising-columns of the English literary journals, notices to the effect that Miss A., or Miss B., or Prof. C. will lecture in the Egyptian Room, or the Halls of Greek Sculpture, or in some other one of the departments, on a given day, at a given hour; and not in London alone, but in all the great cities of Europe, this mode of instruction is so common as no longer to attract attention.

9. EACH ART STUDENT AT PRESENT OBLIGED TO FORM A COLLECTION OF HIS OWN.

"Well, we do not have, and shall not for a century have these advantages, and so we must do what we can without them. Every one in America who has applied himself to studies, it makes but little difference in what field, has been obliged to work at his own charges, and supply himself with books, photographs, and documents of all sorts at his own expense. This is often a heavy burden, and yet it is one that cannot be avoided if an American, obliged to

stay at home, would make progress in any field of research. It is true that, let him do all he may with such means as in general fall to the share of scholars, he cannot accomplish any work, of importance to persons who have had the greater advantages we have described. He must be content if he enriches and enlarges his own mind, or excites an interest in his subject in those about him, or adds—if it be not until he has done with what he has collected at so much expense and pains—to the slowly growing store of aids to learning which time will accumulate here at home.

"This, however, it will be admitted, is not a way of proceeding that is calculated to produce the best fruit for the public. Everything with us to-day tends more and more to system; we are learning the advantages, on the one side, of division of labor, not hitherto possible, perhaps seeing how few there were to do the work required; and, on the other hand, we are seeing more and more clearly the advantage there is in having our means and appliances where they can be got at, and made use of by the greatest number of people. One thing, we observe, is happening in Europe; as the great collections come to the hammer, the best things in them are finding their way to the public museums and galleries; in not a few cases, these collections are left by legacy directly to the nation; sometimes this is not so good a way as the other, for the State has often to accept much chaff in order to get a little good meal; whereas, at a public auction, it can generally choose what it really wants.

"The time seems to have come here with us, when we should begin to combine our hitherto scattered forces, and put our riches into a common purse, if we would make any headway in our art studies. We have shown elsewhere how the Numismatic Society has grown, from small beginnings, to be of some importance, by adopting a common-sense policy: not wasting its money on a building, on furniture, or on any eye-catching devices, but giving its whole attention to the main business of developing and feeding a love of coins. And something of the same sort is doing by the Grolier Club; only, as that is a society with a less serious and more ornamental aim than the other, it has naturally not been satisfied to accept such plain fare. Yet, it has done nothing more than to make its rooms pretty and comfortable, and is doing its best to bring together everything that is to be found here which relates to book-binding and to bibliography. If it should make only a few purchases each year for its permanent collection, and add a few books to its library, it would find that in its case, as in the case of all small but earnest beginnings, the growth of both collection and library would soon astonish the skeptics, who do not believe that anything of importance can be accomplished in such matters without money and an imposing list of patrons."—*The Studio*.

10. VERESTCHAGIN ON AMERICAN ART.

Verestchagin delivered a lecture at the American Art Galleries, and spoke particularly of the "need of the organization of a system of Technical Art Schools throughout the United States as being absolutely indispensable to the development of an American Art, of which he denies the present existence. The *Magazine of Art* differs with the Russian on this last point, and considers that it is simply wonderful how well American artists have done during the last fifteen years, in view of the many disadvantages, under which they have labored.

"On the question of Technical Art Schools the *Magazine of Art* and Verestchagin are at one. The subject has been frequently handled in these pages and it cannot be too often discussed. The intellectual salvation of this country must be worked out through the education of the masses in art. Too much crude book knowledge, of a kind that breeds 'maggots i' the brain,' has been the bane of the American people.

"It behooves the next generation to soften down the harsh outlines of 'intelligence' by the influence of art knowledge applied to the ends of daily life as a preparation for the state of high creativeness which marks the progress of art of an entire nation."—*Magazine of Art*.

Verestchagin has willed, that after his death all his paintings shall be gathered into a permanent exhibition in his native city, Novgorod, to be called the "Verestchagin Museum and Studio."

11. THE CERAMIC ART AND MUSEUMS.

"Increased education in the Fine Arts will produce the result of a discerning public opinion, and a craving for the good and beautiful, and that in proportion to the demand of the many for good art will be the response of the chosen minority gifted with the divine powers of genius."—*The Portfolio*.

"It is certainly not the fault of the American artist, or the English artist in America, that he becomes exhausted, and fertility of ideas yields to sterility, when there is nothing in the heaven above or the earth below to show him what has been done in pottery. This is the plain, simple truth, obvious to comprehend, and simple enough to lead one to conclude that the main chances of rising artists in the ceramic line lies in the foundation of museums of art. There are doubtless capable brains, but they are without impressions, such as the art workers of Europe receive at the many museums of art that are erected and filled for their use and edification. It is very plain to be seen that the artist of the European workshop has refreshed himself at the Louvre, the Vatican, or South Kensington. If he were here, he would starve mentally, as do those who fight against fate in attempting to bring out something original. As yet, America is like a desert to the modeler."—*Potter's Gazette*.

12. AN ART UNIVERSITY FOR AMERICA.

We want an art university in which the purely technical faculty of hand and eye, which must be attained in youth and generally in extreme youth, as in music, is cared for as the specialty of the course; where the intellectual enlargement shall be never lost sight of; where the theory of art—its science, its history, all that is known of its spirit and manipulation, must be carefully studied and appropriated, and at the same time the general influence of the literary life in its subjective aspect—philosophy, poetry, history, all that widens and deepens the character and gives it dignity and that purpose which is one of the most important elements of morality. "The deeper in the character art is rooted, and the wider the range of its roots in their reach for sustenance and support, the greater and more durable its fruits."—*W. J. Stillman, in the Century.*

13. THE PRESENT AGITATION FOR THE ESTABLISHMENT OF A NATIONAL SCHOOL OF ART.

"In a lengthy letter to the *New York Mail and Express* Wilson MacDonald, the sculptor, sets forth his heart's scheme for the establishment at Washington of a National School of Art. Fifteen years ago, the veteran artist brought his plans to the attention of Congress in a petition, but nothing came in the shape of legislation to that end. His suggestions, in their way, are as broad and comprehensive, and no less important, than President Andrew D. White's recent article in favor of a National University in the Capitol City. The Parent Palette Club, of New York, has the matter in hand, and under its auspices the project will be brought to the attention of artists, art schools, educational institutions, the press, pulpit and bar throughout the country. All great movements, such as this needs be, are of slow growth, but in the steadiness of its growth will come the solidarity and unity of purpose necessary to give it a national character. Briefly outlined, the scheme is to have the Government erect a building for the academy

and gallery, with accommodations for 2,500 students, with all the accessories needed to make it the first school in the world. The fitness of Washington is so eminent that no opposition can be manifested. The best teachers in art must be employed, and the establishment of a new department of fine arts would be a natural sequence to the establishment of the school. Appointments would be made to the school as cadets are now to West Point and Annapolis, subject to examination as to aptitude and ability. The public schools in which drawing is taught will be found prolific sources from which embryo artists and sculptors will arise. The grand idea which lies beneath the project is the development of a National spirit of art. No nation, Mr. MacDonald argues, has ever attained high rank in art which has not developed such a spirit. Surely America, with its vast extent of country, its magnificent scenery, its varieties of fauna and flora, its unlimited resources, the peculiar types of civilization which it produces, is capable of doing that. Another point is brought out clearly in the argument, and that is that our enormous material sources of wealth have been in no small degree dependent on the art spirit for development. It is not many years since nearly every article of virtue, beauty, and ornament was imported from Europe; now our fine furniture, clocks, mantel ornaments, wall papers, engravings, bric-a-brac, and fabrics are produced at home. If a national spirit and direction be given, the great results already reached, will be followed by still greater ones, all tending to the mental and material enrichment of America. This is not the project of a day. Aladdin's lamps are not the gifts of the Republic. Out of the friction of many minds comes our development toward the future greatness which will tower as a mountain over the mole-hill progress of to-day. Following fast upon the accretions of material wealth, will come with its more equitable distribution, the knowledge which will teach us how to enjoy that wealth. And art will line the avenue which science has built for man."—*Washington Post.*



Drawing.

BY CHAS. F. ZIMMERMANN, LATE SUPERINTENDENT OF DRAWING, MILWAUKEE PUBLIC SCHOOLS.

OUR foremost educators advocate the study of drawing as the first step in any system of industrial education, and thousands of teachers are now taught so as to enable them to give the *required* instruction in drawing in their schools; but how many have made this instruction of service to them in their classes when teaching other subjects? It must become a habit with our teachers to observe everything accurately, record their observations, engrave the picture upon the mind, and in this way gain the power of recalling it when needed in the class room.

As teachers we should learn all those principles of general knowledge, in the sciences and in the arts, for which the practice of drawing is necessary, in order to make plain to the public the usefulness of this form of language. It is a means by which we represent every object in nature as well as in art, from the simple leaf, pebble, rock, tree, to the animal form, landscape and human figure; from the simplest ornament to the statue or grandest architectural conception; from the simplest mechanical device to the most complicated and powerful machinery of the present. Violet le Duc says: "I hardly know of a career in which drawing would not be useful, if not absolutely necessary, for the very simple reason that it teaches one to see correctly, to remember what one has seen, and to give form to thought."

Herbert Spencer writes: "The spreading recognition of drawing as an element of education, is one amongst many signs of the more rational views on mental culture now beginning to prevail. . . . Had teachers been guided by nature's hints not only in making drawing a part of education, but in the choice of their modes of teaching it, they would have done still better than they have done. . . . From all that has been said, it may be readily inferred that *we wholly disapprove of the practice of drawing from copies.*"

2 GIVES ACCURATE SIGHT AND SURE TOUCH.

Philip Gilbert Hammerton, fine artist and critic, sets forth the value of art culture in the following plain language: "Practical art has one distinct advantage over all purely intellectual pursuits, which is, that it does not educate the mind only, but also the eye and the hand.

I am well aware that a foolish prejudice, which if it is dying out, is dying too slowly, considers this training of eye and hand a mark of degradation, because the skilful use of these physical organs assimilates the artist to the artisan. Some people—but not the wisest—are as proud of having idle and useless hands as Chinese ladies are of their useless feet. With these, all reasoning would be a waste of time; but to others who have no such prejudices, I may offer a few remarks in favor of this ocular and manual education. Let it not be supposed that the education which we gain from the graphic arts is by any means limited, in its effects, to the actual practice of those arts themselves. The eye which is trained by drawing discerns form everywhere and in everything; the hand which is skilled to use pencil or brush will be generally superior in delicacy and accuracy of touch to the hand which has never been taught. The question, therefore, is not simply whether we care to be skilful in drawing, but whether we prefer a keen eye to a comparatively blind one, and a ready hand to a clumsy one. There are a thousand things to be done in ordinary life, as well as in different trades and professions, in which accurate sight and sure touch are desirable. Surely a branch of education which gives these, not as substitutes for intellectual analysis and synthesis, but in addition to them, has so much the more in its favor."

3. TO DESIGN IS TO OBSERVE AND REFLECT.

We quote once more from Violet le Duc: "In the study of drawing there are two elements, physical labor, the exercise of the eye and hand; and intellectual work, that is, the habit of observing with exactness, and engraving on the memory what one has observed, so that the mind can compare, and draw deductions from the comparison. . . . One learns to see only by drawing, *and not from engraved patterns*, but from objects themselves; and further still, only on condition of being able to explain these objects, and to describe their properties, and their relations to each other. . . . I do not claim to be able to make an artist of Jean, he will become one if he has it in him. I propose only to teach him to see correctly: to consider what he sees, and to render it so that his observations may serve him, whatever the career he follows, whether that of a workman or a soldier, merchant or

lawyer, artist or engineer. . . . To design is not to see a thing, but to observe it. All who are not blind, see; yet how many people are there who *know how* to see, or who *reflect* as they see?"

4. THE GREAT MASTERS DRAW FROM MEMORY.

Taking Rubens saying that "*To see, to understand, to remember, is to know*," as her motto, Madame Cave has had great success in teaching drawing by laying stress upon memory drawing. She says: "Drawing from memory is having one's thoughts, the expression of that thought, at the point of his pencil as the writer has his at the tip of his pen. All the great masters drew from memory; hence their originality. . . . Consulting, copying, kills invention and genius; composing, putting the thoughts rapidly upon paper by the aid of memory, that is the true process of invention. . . . As soon as you see correctly, you feel correctly, you execute correctly. . . . If you follow your eye, your observation, you will secure correctness, you will find truth, you will be natural, and naturalness is simply truth. This accuracy, this naturalness, is the result of much observation, of great memory."

5. AN INVALUABLE ELEMENT IN GENERAL EDUCATION.

To fully impress the importance of the subject under consideration, upon the American public, the testimony of some of the leading educators in this country is herewith presented:

"Drawing is an invaluable element in general education. To the workman it is of the greatest practical use; it makes him a more intelligent and serviceable workman. If he attains a real skill in the use of his pencil, and develops the tastes and talents that cannot without this training be either discovered or made use of, he becomes a valuable person at once. Every branch of our manufactures is suffering from the want of just this intelligence and skill."—*William R. Ware, Prof. of Architecture, Columbia College, New York City.*

"Drawing, if properly taught, is extremely useful as an aid in other studies; and indeed, in my judgment, it quite compensates for the time it takes, by facilitating instruction in other branches. . . . The introduction of drawing into our schools I regard as one of the most important and practical educational steps ever undertaken in this city, and there is no part of my work as an educator which I look upon with more satisfaction than upon my efforts to secure efficient instruction in drawing in the public schools of this city and State."—*Dr. John D. Pratt, N. Y. C.*

There is need of a knowledge of forms, which is an important element in industrial education, can only be learned by the study of forms, which should be taught

in all our public schools by competent teachers; the time required to lay the proper foundation for future special applications need not be disproportionate to other studies."—*Dr. J. D. Runkle, Mass. Institute of Technology, Boston.*

"I regard the study of Industrial Drawing as absolutely essential, not only to sound technical education, but as of the utmost importance to the industrial interest of our country, and have urged a wider attention to it, both upon our schoolmen and our legislatures. It is gratifying to know that the public mind is already awaking so widely to the importance of the training to be derived from studies in drawing."—*Dr. J. M. Gregory, late President Ill. State University.*

6. ARTIST AND ARTISAN BROUGHT TOGETHER ON COMMON GROUND.

"I cannot refrain from expressing my conviction as to the immense importance of this whole movement of art education to the industrial interest and social well-being of this country. We are constantly told that art belongs to the refinements of civilization, and that therefore it has no place in the schools, where the great mass of men and women who must ever remain strangers to its enjoyments are educated. That so large a share of the people are deprived of the elevating influence of aesthetic feeling, is the very strongest reason why the schools where they are to receive their intellectual training should be made available to bestow upon them a possession capable of yielding so much real benefit to themselves, and of so much consequence to the society of which they form a part. But art has other uses than to minister to cultivated tastes in sculpture and painting. One of the noblest purposes to which it can be put is in applying the laws of ornament to the productions of industry. It is here that art becomes universal in its influences; it is here that the artist and the artisan are brought together on common ground, and the taste of the studio is joined to the skill of the workshop in ministering to the common wants of men of all classes. There is no class of our people so deeply concerned in making this matter of art a part of our commonest education, as the men whose toil lies at the foundation of our industrial wealth. It is simply a question whether our workmen are to be left to handle the materials of industry in their crudest condition, or whether they are to be transformed, by education, into creative forces, capable of giving to the wood and iron, and stone, which pass through their hands, forms of beauty which shall lend assistance to their use; and thus, while enriching and improving the whole circle of society, be rendering themselves worthy of recognition as one of its noblest factors.

"I believe the introduction of Industrial Drawing into our common schools to be the first step in the organiza-

tion of a system of industrial education which, if fully carried out, will be productive of effects upon the social character of the working classes and the wealth of the nation, which even the most sanguine would not dare at this moment to predict."—*James MacVister, Supt. of Public Schools, Philadelphia.*

7. ECONOMY OF LABOR IN THE WORKSHOP.

"Among the many ways in which art knowledge may be of use in the workshop, is the economy of labor arising from the workman having definite objects in view, and having to make no experiments in carrying out work which must be executed to scale, plan and design. I venture to say, that in every workshop or factory where no knowledge of drawing is possessed by the workmen, there is a waste of time and an inferior article produced in the end—evils which are a loss to the employer, through sacrificing of his material and inferiority of work; a loss to the workman, by his time having been wasted in experiments; and a loss to the public of tasteful objects to be obtained at a moderate cost."—*Walter Smith.*

8. DRAWING IN BELGIUM BASED UPON SCIENTIFIC PRINCIPLES.

M. de Lajolais, a member of the Industrial Congress gathered at Brussels in 1868, says: "Instruction should be given at first to children, in knowledge of form, then they should be accustomed to the habit of following and understanding the transformation of exact forms into ornamentation. The study of drawing, in the first instance, develops the intelligence of the child in teaching him how to see. To see with the eye of a designer is to create the sense of exact observation and of analysis; and these results can be attained by a series of attractive exercises." This Congress further recommends "the necessity for the radical reorganization of the elementary teaching of the fine arts by the substitution, for the routine methods in use, of a uniform and rational mode, based upon scientific principles, which are the essence of art itself; to suppress the common prints and engravings now used as models; to base the study of drawing upon the elementary principles of geometry." In 1871 the Minister of the Interior, in his circular letter to the provincial inspectors of primary instruction, declares: "The government, in the task it has undertaken, counts upon the concurrence and support of the communes and provinces. It is a question of national interest, since its principal object is the progress and the development of the artistic sentiment of the country."

9. DRAWING AND INDUSTRIAL SCHOOLS THE TRUE BASIS OF WEALTH OF A NATION.

Immediately after the war with France, the authorities of the various industrial towns of Prussia were called upon, in a circular issued by the Ministry of Commerce and In-

dustry, to follow the example of France in the organization of Drawing and Industrial schools: and their attention was directed to the industrial importance of these schools, and to the fact that they form the true basis of the wealth of France.

The French Commission which was appointed to examine matters pertaining to the improvement of the industries of France, in the year 1863, reports as follows: "Among all the branches of instruction which, in different degrees, from the highest to the lowest grades, can contribute to the technical education of either sex, drawing in all its forms and applications, has been unanimously regarded as the one it is most important to make common." And the opinion of the French Commission in 1876 was that "France ought to devote herself to the study of drawing and reinvigorate her productive powers at the very sources of art."

10. ELEMENTARY SCIENCE AND DRAWING FOR THE WORKMAN AND ARTISAN.

The late report of the royal (English) Commissioners on Technical Instruction contains the following:—

"For the great mass of our working population who must necessarily begin to earn their livelihood at an early age and from whom our foremen will be mostly selected, it is essential that instruction in the rudiments of sciences bearing upon industry should form a part of the curriculum of the elementary schools, and that instruction in drawing of a character likely to be useful in their future occupations as workmen and artisans should receive far greater attention than it does at present. . . .

"This want of attention, together with the *absence of competent teachers, proper models and methods*, and adequate inspection, fully accounts for the inferiority to which we have referred. . . . Your commissioners are of the opinion that *sound instruction in the rudiments of drawing* should be incorporated with writing in all primary schools both for girls and boys. . . .

"Assuming such preparation in the infant and elementary schools as we have here suggested, the progress of subsequent instruction in art classes would be immeasurably more rapid. . . . Industrial design, for a variety of reasons, the chief of which are the *want of sufficient knowledge of manufactures on the part of art teachers* and the absence of sympathy evinced by the proprietors of industrial works, has, with some notable exceptions, not received sufficient attention in our art schools and classes. In fact, there has been a great departure in this respect from the intention with which the 'schools of design' were originally founded, viz., 'the practical application of (a knowledge of) ornamental art to the improvement of manufactures.' Large grants of public money for teaching art to artisans in such classes can scarcely be justified on any other ground than its industrial utility."

11. DRAWING MORE NECESSARY THAN READING OR WRITING.

Since the report of the committee on Technical Education, drawing has been incorporated in the code, and is now a compulsory subject in the elementary schools of Great Britain. Commenting thereon, Mr. Harry V. Barnett, in *The Magazine of Art*, writes thus:

"It is now generally agreed that the systematic and compulsory teaching of drawing to young children is a very beneficial part of their preparation for the practical work of life. If, having learned at school to describe things with a pencil, they afterwards enter those trades in which a knowledge of drawing is necessary, they find their initial difficulties very much lightened, they are ready to begin practical work at once, instead of having to learn the A B C. And if, on the other hand, the business they take up does not demand a knowledge of drawing, then, it is argued, they have lost nothing by being taught it, because it is, apart from its special utility in various handicrafts, a good general training for the mind; you cannot draw even a very little without observing and thinking, for which, I believe, no one is ever the worse. Many people seem to suppose that the chief object of teaching drawing to children is to make them great artists. This is a fine old crusted British superstition, handed down from days of dismal ignorance and vague ambition. It would be just as reasonable to suppose that the chief object we have in teaching everybody to read and write is to make everybody a man of letters. Drawing is in this sense one of the things which it is useful to be able to practice, and is in some trades a part of elementary knowledge even more necessary than reading or writing.

12. SHOULD BE COMPULSORY IN ALL ELEMENTARY SCHOOLS.

"One of the main points brought out by the Technical Commission, is that the nations of the continent understood all this sooner and better than we did, and in many instances incorporated drawing with writing as a compulsory subject in their elementary schools. Every one who studies the question at all, or who does nothing more than read the report of the Commission, finds overwhelming evidence that the effects of this system are wonderfully beneficial, both in laying the foundation of the higher and special art training that a youth may eventually receive, and in perfecting all those handicrafts and industries into which drawing, and all that drawing embodies, enter more or less. And since the tendency of trade is more and more toward competition on lines of artistic and technical excellence, and since we have already lost important industries to our own backwardness in these particular, the Commission is right, what we do abroad and what we have often been recommended that drawing should be made compulsory in all elementary schools, and the educational authorities, after hesitating for awhile, have

carried this recommendation into effect." Speaking of the kind of drawing most necessary to be taught, the writer proceeds: "It is better to make free-hand the basis of the other kinds of drawing, than to make them, or any one of them, the basis of free-hand. And it is certain that free-hand is the most generally useful in itself, and the best of all, considered as a means to train hand and eye and mind."

13. LARGE SCALE WORK BEST.

Speaking of drawing with sharp lead pencils on small pieces of paper, so much in vogue, Mr. Barnett proceeds:—

"And just because it is always on a small scale, it is destructive of the two most necessary qualities: strength and style, it leads the pupil to be forever thinking of finicking details and hardly ever of mass and proportion and breath, and so train him insensibly but surely to see large things in a small way; to take narrow views and express them in a laboriously little manner. The consequence is, of course, that, even when a youth has gained some command of means, as it is not denied he may do by this method, when he comes to make full-sized drawings of furniture, of decorative design for wall-papers or textiles, of architectural ornament, of ironwork, in short, of anything whatever that is to be practically manipulated, he finds that he has to begin again, almost from the beginning; that what will suffice for Christmas cards is useless in matters more substantial; that to have learned to draw on a small scale does not enable him to draw on a large. It is, however, the large scale work that is wanted in the workshops and manufactories, as well as in the studios; and, what is everywhere evident in English art, the qualities of handling and of mind that are thus produced by training on a large-scale system are more needed still. They do these things better abroad; and of course we find in France and Belgium that instead of training a lad to draw with a lead-pencil on a piece of paper measured by inches, they first give him a good lump of chalk and a blackboard measured by feet. The child, in short, begins by learning to reproduce lines, and arrangements of lines, on the largest scale possible to his youthful arm. When he has got his hand in with chalk and a blackboard he is advanced to charcoal and a large sheet of brown paper; and so on until he enters the workshop or the art school. Here, of course the system is directly the reverse of ours, and the consequence is that Continental boys of twelve or thirteen can produce large-scale drawings from either flat or round that, I do not hesitate to say, could not be equalled by any art student in England of twice the age and training, excepting always those who have been specially trained in manufactories and workshops, and the pupils who have the luck to work under Mr. Legros, at University College, where the antiquated illogical British system does not obtain. This is no mere opinion of my

own, but a fact brought out with signal emphasis in the report of the commission, and strikingly illustrated by the drawings that were so remarkable a feature of the Health Exhibition. There France and Belgium were represented by a varied series of drawings, executed in elementary schools which put the exhibit of the English government art schools entirely in the shade. South Kensington had not a solitary work of the same class that, as regards all essential qualities of art, and least of all as regards style, could compare with those drawings by foreign lads. To go round the Exhibition with ones eyes open was to see that the superiority of Continental design and art manufactures over our own is largely due to the sound and liberal kind of free-hand that is taught as part and parcel of general education in the Continental primary schools."

14. GIVES A BROAD, GENERAL TRAINING FOR LIFE.

"The discovery and application of thought as embodied in things will answer as a broad foundation for manual training, and the best study adapted to these ends is what is properly known as *industrial drawing*. For this study not only gives a general training applicable to a great variety of pursuits, but is of the greatest value in developing every common school study at all related to form. Not only does it develop purely utilitarian ideas but also cultivates an appreciation and love of the beautiful in nature and art. Its development is in the direction of usefulness, beauty and morality. It gives opportunity for development in every desirable direction. It leads to the observation of things and to their expression by language, drawing, and construction. It stimulates the inventive faculty. It cultivates a knowledge of design, and in brief, gives a broad, general training to all boys, to all girls, in preparing them for every sphere of life."—*Prof. Charles M. Carter, Mass. Art School, Boston.*

15. FROM A LOW PLANE TO LUCRATIVE POSITIONS.

"Having had the direction of two of the largest schools of this description (evening schools for industrial drawing) in Boston, from their beginning to the present time, covering a period of seventeen years, I can speak with some authority regarding them, and can testify to the wonderful benefits which the pupils have received. Hundreds of them have been helped to a higher plane in their craft by means of the instruction afforded. In fact, it may be truly said that the industrial drawing schools have a very important influence upon the industries of the State. Many of the pupils are now employed in the designing rooms of the mills, and many others are filling excellent positions where a knowledge of drawing is absolutely necessary. In these schools almost every nationality and every trade are represented by the pupils who attend them. There are hundreds of young men who

have attended these schools who at one time were on the lowest plane in their trade, and would have remained there had it not been for the knowledge thus obtained; but to-day they are filling some of the highest and most lucrative positions."—*Prof. George H. Bartlett, Principal Normal Art School, Boston, Mass.*

16. A UNIVERSAL LANGUAGE THAT SHOULD BE READ AND UNDERSTOOD BY ALL MEN.

"Drawing is the short-hand language of modern science. Careful drawings are to technically educated people what pictures are to children. They show at a glance what it is not in the power of words to express. It is a universal language, and should be read and understood of all men. But drawing has another use of equal value. It is the most potent means for developing the perceptive faculties, teaching the student to see correctly, and to understand what he sees. Drawing, if well taught, is the constant practice of the analysis of forms, and by this practice the eye is quickened and rendered incomparably more accurate; and as the eye is the most open and ready road through which knowledge passes to the mind, the full development of its powers can be a matter of no small importance to all. In this respect, then, as an educator of the eye, drawing is a most valuable means, irrespective of any service that the power may be of itself. But there is another faculty engaged in this study,—that one which distinguishes man from the cleverest of the animals,—the hand is employed, and it also is educated and trained to be more completely under the control of the will than by any other exercise it can be set to; it acquires a delicacy of movement and a refinement of power which no other discipline can impart, and which fits it more completely to perform its varied and delicate functions."—*Dr. C. M. Woodward, St. Louis.*

17. WE MUST ORGANIZE SCHOOLS FOR SYSTEMATIC ART INSTRUCTION.

The place of art education in any school system is fully set forth in the foregoing pages, and there need henceforth be no question in the minds of the intelligent people of our country as to the course to be pursued with reference to this subject. We must profit by the experience of European nations. "The spirit of the times carries everything along, and those who would stand still must go to the rear." If England, France, Belgium, Germany, and Austria, who have for years been making great efforts to raise the intelligence of the industrial classes by establishing art and technological schools, art museums, lecture courses on science and art, evening and training schools, and by making drawing and modeling a part of the public school education, find it necessary, nevertheless, to re-organize their systems of education, so as to lay greater

stress upon industrial drawing, devise better schemes for general instruction in art, and want better teachers and appliances for teaching drawing in the schools, how much more have we need of all these things!

18. NORMAL INSTRUCTION.

Some of the directors of our Normal Schools have not yet fully comprehended the necessity of training their students in this direction. Neither has the subject of art education received much attention in teachers' institutes, or conventions. Our leading educators everywhere urge its importance, but opportunities for the teachers to thoroughly fit themselves for their work are not provided in most of our communities, nor are appliances for successful teaching at hand.

19. ART CLUBS.

We would therefore urge upon teachers to help themselves by forming art-clubs for the study of drawing, modeling and wood-carving. By regular small contributions, simple appliances, models and casts could be secured and art books purchased. Information as to organization and order of work can be obtained by correspondence with teachers and artists in sympathy with this movement, and some models in wood and iron secured by gift from manufacturing establishments. The advice and help of a good teacher is certainly a great aid in prosecuting the study, but it cannot always be had, and many instructors lack the patience necessary to teach the elements. The effort once made should not be abandoned. The members of the club should make themselves familiar with the industries in which artistic skill is required. In no better way can they learn to value skill than by becoming pupils themselves in some manual or artistic work. Did not the great masters in pedagogy organize departments in their seminaries where skilful manual labor could be practiced, and are not institutes held in Germany at the present day to which teachers repair to pursue the six weeks course in manual training? Even professors do not disdain to take their place at the bench—an example not unworthy of our imitation. Some of our most noted artists are equally skilful with tool and brush.

20. EXAMPLES FOR STUDY.

We must have trained teachers first, but good examples for study are indispensable if we are to lay a sure and broad foundation in art. The foremost educators, seconded by their respective governments in Belgium, France, England, and Germany, emphasize the value of drawing from nature, and from the best examples of ancient and modern art, as the only way to keep the student true. The copying of numerous forms is a waste of time, and deadens the interest in the study of art. But lead our

youth to appreciate the beautiful in nature and in art, and you kindle an enthusiasm which will grow with years, develop a finer and purer taste, and awaken nobler aspirations. A leaf, a prism, a pyramid, a simple conventional ornament in relief, a model of a joint, truss, bolt, or wheel, as examples for study are infinitely superior to the printed picture of these objects. So, too, if the pupil is taught to make the geometrical solids of paper or wood, to model his ornament in wax or clay, or carve it in wood, or make the mechanical model in clay or wood, he will have gained immensely more and know the beauties of the form better than if he had copied scores of examples from the flat. The study of the concrete object should take the place of the printed copy, and the construction of these forms in some simple material should take the place of committing definitions to memory. That it requires more knowledge and skill on the part of the teacher to teach from nature is unquestionable, but shall the teaching of drawing be on a par with the antiquated method of hearing recitations from a text book? Every drawing lesson should be an appeal to the observing faculties and the understanding. If we wish to cultivate the mind while gaining skill of hand, we must draw near to nature and learn to comprehend her laws and her designs. If we cannot discover them, we must attribute it to our ignorance. Our pupils will never regret the time spent in studying drawing from nature, or from models in wood or plaster; and we will be repaid by the consciousness of having introduced them into the world of beautiful forms which are a source of constant enjoyment, and prepares them better to perform their part in life.

21. SYSTEMATIC INSTRUCTION NECESSARY.

The instruction in drawing should be systematic, having an end in view, and adapted to the capacities of the pupils in the different stages of school work. If we wish our pupils to understand nature and interpret her correctly, we must continue in a long course of drawing from the geometrical solids, from the cast of ornament in different styles, and accustom them to draw whatever they see and on all occasions. All the first drawing must be free-hand, depending only on the eye, the teacher correcting the drawing and gradually introducing the pupil to the first elements of perspective. The work should be on a large scale, and with a soft crayon-like pencil. It is better to make ten different drawings than to spend the same time upon one drawing. Accuracy of delineation should be exacted, but not at the expense of rapidity. The pupil should be accustomed to draw from memory at the start and continue this valuable exercise throughout the course. I believe that for the great mass of children in our common schools the habit of free-hand drawing is more essential than work with instruments, for free-hand must be the

foundation of any system of training whether for artists or artisans. The mechanical draftsman, the architect, the engineer are frequently obliged to express their ideas by sketches or off-hand drawings of works which come under their observation.

22. COURSE OF STUDY.

We give herewith the outlines of an elementary course in drawing :

1. Drawing from the blackboard.
2. Study of the geometrical forms, plane and solid.
3. Outline drawing from the geometrical solids and vases.
4. Outline drawing from objects.
5. Drawing from casts of single leaves.
6. Drawing leaves and flowers from nature.
7. Drawing from cast of ornament.
8. Practice in the use of draughting instruments.
9. Linear geometry.
10. Elementary design.
11. Elementary perspective.

23. AN ADVANCED COURSE FOR HIGH SCHOOLS.

1. Outline drawing from groups of geometrical solids and vases.
2. Outline drawing from the cast of architectural ornament.
3. Outline drawing from the cast of flowers, fruit and foliage.
4. Drawing from the geometrical solids and vases, shaded with charcoal.
5. Drawing from the cast of architectural ornament, shaded with crayon.
6. Drawing from the cast of flowers, fruit and foliage, shaded.
7. Drawing from objects, shaded.
8. Drawing details of human figure from the cast.
9. Geometrical constructions.
10. Elementary projection, orthographic and isometric.
11. Linear perspective.
12. Details of construction.
13. Elementary structural drawing.
14. Theory and harmony of color.
15. Shading and tinting with pen and brush in India ink and water colors.
16. Analysis of plant forms for purpose of design.
17. Analysis of styles of historic ornament.
18. Principles of applied design.

24. ELEMENTARY INSTRUCTION.

The plane geometrical forms used in the early study of drawing should be of pasteboard or wood, and in the hands of the pupil. The drawing of these forms should be free-hand and on a scale larger than the model. The teacher may, however, frequently allow the pupils to trace around

the forms, in order to fix the correct idea of the figure in the mind of the learner. The outlines of leaf forms can also be drawn at this early stage.

We begin the study of the solids by drawing the sphere and the spheroids, and natural forms and objects based on these solids. The outlines of vases can be drawn with much profit at this stage. Next the study of the cone and cylinder and forms based on them. Much time can now be profitably spent in the study of the cube and the square prism. The elementary principles of perspective thus developed will aid materially in the drawing of the remaining geometrical solids. Form study should go hand in hand with drawing, and the construction of the solids in some simple plastic material encouraged. By cutting forms out of paper or pasteboard, and pasting, the development of surfaces is practically and easily taught.

25. SOME SUGGESTIONS.

In drawing the outlines of leaf forms, or from casts of ornament, the following order may be observed:

1. Draw the principal perpendicular and horizontal lines first, as we can only judge of the slant of the oblique lines by comparing them with some standard lines.
2. Sketch the general shape of the object, and decide upon the correct general proportions.
3. Draw the parts definitely and add no details until the work is accurately laid in.
4. Erase the lines until they are just visible.
5. Line in, or make the true outline. The line should be of equal thickness.

Draw leaves and flowers from nature. With the natural form as a basis, draw the conventional form, which is regular and symmetrical. The conventional leaf form is used in all good ornament.

It makes very little difference what instrument is employed in the beginning. Giotto—once a poor shepherd boy, used a stick, and made drawings of his flock in the sand, and on flat stones. A piece of charcoal and the wall, or a piece of chalk and the blackboard have been helpful to many a one. The student should consider his tools of secondary importance. Let him supply them as he feels their need. The draughtsman relies upon his trained hand and eye that direct the medium used, and not upon the instrument itself. The quill, the steel-pen, the lead-pencil, the crayon, each has its place in drawing, and the student should learn to use them all. The paper should not be too smooth, but have a rather rough surface. The less the India rubber is used, the better.

26. DRAWING FROM OBJECTS.

In studying the solids as they appear, draw them in their simplest positions first, and notice the apparent convergence of the parallel lines: also that the representation

of a circular plane, when viewed obliquely, is an ellipse. These elementary principles of perspective once mastered will aid the student materially in his progress. Always draw the model as *you see it*, and not as you remember having seen it represented. You will be greatly helped in the beginning when drawing the outline of an object, to use only one eye, as the object then appears flat, and not as a solid. When judging distance we must use both eyes. When we wish to see the principal masses of light and shade, we partially close both eyes.

Wire models have been constructed to aid in the study of the appearance of solids. A pane of glass placed vertically between the student and the object, can also be used to advantage. The lines bounding the object can be traced upon the glass, and the observations made by the eye verified.

Good books on the subjects of model drawing and perspective can not easily be obtained. There is, however, no royal road to drawing any more than there is to the attainment of knowledge. Books and teachers may be consulted, but the student who is not serious in his study of Art, who does not make a conscientious effort to master the difficulties presented in each stage of work, need not look for success. The *eye* as well as the hand must be trained. Men are not born with capacities for art beyond the great mass of their fellow-men. They can only rise above the common level by study and right training.

27. WORKING SKETCHES.

The regular geometric solids should also be studied with reference to their construction. Three views of each object should be drawn, that is: a front view, a view from above, and a view from one side; the views must show corresponding measurements. These views are not perspective drawings, but simple free-hand "working sketches." In making these sketches draw the lines which represent the contour of the object and are seen as full lines; the inner lines are either seen or hidden; if hidden, they are drawn as dotted lines. In drawing the sections of solids, draw the cross section, the longitudinal section, and the oblique section of each solid.

28. DRAWING THE FEATURES.

In attempting to draw the features of the face from the cast select as the simplest and easiest one which shows a full or front view of the mouth. Study the cast, think before you draw, and having decided upon the proportions of the parts, put the general idea obtained on paper and compare the proportion, so as to make it one harmonious whole. Compare the sketch with the cast before you, and continue your study and description until you have obtained a drawing which shall correspond in form and character to the model before you. It is not wise to imitate

the off-hand and ready manner of the expert draughtsman. It will only result in failure. You can only get strength as you go along. The power to delineate with accuracy and rapidity can only be acquired by patient study and unceasing toil. The study of one feature in the manner indicated above will contribute more to your progress than a dozen desultory sketches. For, unless the first difficulties are mastered, the student will soon find himself entangled and unable to extricate himself. Following the study of the mouth, the eye, the ear, the nose, and the face may be taken up. Always draw on a large scale giving special attention to correct outline and proportion of parts. No amount of time spent in shading will make up for poor drawing of form. For the beginner, casts are much better than the living model, and a collection of good casts should be found in every school-room. White models or casts are the best to work from, because the laws of light and shadows are best studied from them: being non-absorbent, they reflect all the rays.

While pursuing the course outlined above, either under guidance or at home, let the student also attempt to draw from objects and from nature as his fancy directs him. By doing so he will encounter difficulties which will test his strength, and have a strong tendency to give additional impulse to his studies. It will also cultivate that love for art which sometimes suffers by adhering too rigidly to a prescribed course.

Let the student further test himself by attempting to reproduce drawings from memory. If he cannot remember what he has once learned, if he cannot draw except what he sees before him, he is not only losing much of the good already acquired, but failing to prepare himself for the application of his knowledge. The draughtsman, the artist, the designer are constantly obliged to draw upon the rich stores of knowledge acquired during the years of preparation for their profession.

29. ELEMENTARY GEOMETRY.

Some knowledge of elementary geometry and the methods of constructing the most important mathematical figures is necessary to every art student. It will help to clear the path to truth, solving many perplexing difficulties, and store the mind with ready and reliable expedients for the attainment of certain definite ends. These results must not only approximate truth, but be definite, precise and accurate. The value of the work is lost, if it is carelessly done. The instruments used are the ruler, triangle, square, compasses, scale and protractor. Others can be added as required. The use of each of these instruments can easily be learned, as also the methods of testing their accuracy. In the solution of problems where mechanical aids are employed, no part of the work should be attempted free-hand.

Some of the elementary problems are herewith suggested:

1. To bisect a given line or arc.
2. To erect a perpendicular to a line at its middle point.
3. To erect a perpendicular to a line at any point.
4. At the extremity of a line, to draw another perpendicular to it.
5. From a given point, to draw a perpendicular to a line.
6. Through a given point, to draw a perpendicular to a line.
7. To draw one line parallel to another.
8. To draw an equilateral triangle.
9. To construct a triangle with given sides.
10. To construct a triangle similar to a given triangle.
11. Make an angle equal to a given angle.
12. To divide a line into a given number of equal parts.
13. To construct a square.
14. To construct a parallelogram when an angle and the adjacent sides are given.
15. To make an angle of 60 degrees.
16. To bisect an angle.
17. To make an angle of 30 degrees.
18. To make an angle of 45 degrees.
19. To find the centre of a circle.
20. To find the radius of a given arc of a circle.
21. To describe a circumference through three given points, not in the same straight line.
22. To draw a tangent to a circle at a given point on the circumference.
23. With a circle, to circumscribe a triangle.
24. With a circle, to circumscribe a square.
25. With a circle, to circumscribe a rectangle.
26. With a circle, to circumscribe any regular polygon.
27. To draw a line tangent to a circle, from a point without.
28. To draw a line tangent to two circles.
29. To describe a circle tangent to a given circle.
30. In a circle, to inscribe a regular hexagon.
31. In a circle, to inscribe an equilateral triangle.
32. In a circle, to inscribe a square.
33. In a circle, to inscribe an octagon.
34. In a circle, to inscribe any regular polygon.
35. To inscribe a circle in a triangle.
36. To inscribe a circle in any regular plane figure.
37. Upon a given base to construct any regular polygon.

It will frequently happen that work must be done off-hand when no tools are near, or when the small draughting instruments will not answer the purpose. In such cases it is necessary to resort to expedients, using such

material as is within reach. A stout piece of paper, or cardboard, a bit of thread or cord, a few pins or nails, a lath, may be all that are necessary.

30. ELEMENTARY PROJECTION.

Instead of free-hand sketches of the projections of the solids, they should now be drawn with great accuracy by the use of instruments. Begin with the solids bounded by plane surfaces, such as the cube and the prisms, in various positions. (Page 1.) Follow with pyramids, cone, cylinder, and other regular forms shown on pages 1 and 2. Having drawn the different projections of the above-named solids, there will now be no difficulty experienced in drawing Nos. 3036, 3040, 3041, 3037, 3039 and 3035, on page 2. Here we have tangible objects for our study, not mere abstractions. The models can now be parts of machines, or architectural details, which are first studied, then sketched, and lastly, drawn to scale, making complete working plans from which a duplicate of the original could be constructed.

31. COURSE IN DRAWING IN THE PHILADELPHIA MANUAL TRAINING SCHOOL.

We give below the excellent course adopted by the Board of Public Education of Philadelphia for the Manual Training School of that city. It will serve as a guide to others who contemplate the introduction of a thorough course in industrial departments connected with the High School, or the grammar grades of our common schools.

"From the beginning the pupil is taught to interpret working drawings, and to reproduce them from the indicated forms. He must understand the language in which they are described, and acquire by education and experience the ability to obey it.

"While drawing underlies all industrial work, its application is not limited to mechanical construction. Throughout all the departments, drawing is the common language used in explaining facts, ideas and principles. By means of historical, botanical, and topographical maps, literary and economic charts, geometric and electrical diagrams, anatomical and geological sketches, the pupil graphically expresses the lessons taught in the class-room.

32. FIRST YEAR.

"CONSTRUCTIVE DRAWING. (*Mechanical*.)—Proper care and use of instruments; class study of the geometric facts of shape and size in typical solids; the method of representing and describing such facts applied in the preparation of free-hand dimension sketches of the exercises which are afterwards made in the shops; finished working drawings made to scale from them; orthographic projections: sections and intersections, and surface develop-

ments: lettering: conventional methods and technicalities in accordance with the best modern practice of the draughting-room.

"REPRESENTATIVE DRAWING. (*Free-hand*).—The analysis of forms singly and in groups, prepare for their accurate representation on paper, or the blackboard. Much practice is given in making drawings of various objects seen out of school, yet based upon the simple geometric solids, casts, and natural forms upon which the pupil has received instruction and practice in the school-room.

"DECORATIVE DRAWING. (*Design*).—Elementary geometric design: straight lines, curve lines, and their combinations: geometric figures: elementary conventional design.

33. SECOND YEAR.

"CONSTRUCTIVE DRAWING. (*Mechanical*).—Preparation of finished working drawings from free-hand dimension sketches, from blackboard drawings, and from dictated directions: drawings of patterns and forge work to be used in shops. Shop tools and machine details—such as calipers, wrenches, pipe fittings, pulleys, details of engineering structures: parts of lathe: steam engine, etc.; development of surfaces applied in preparing working drawings for tin smithing exercises.

"REPRESENTATIVE DRAWING. (*Free-hand*).—Representation of the appearance of the rectangular and circular objects, with shades and shadows. Free-hand drawing from simple casts, and natural forms.

"DECORATIVE DRAWING. (*Designing*).—Typical historic forms, and simple natural forms conventionalized: design to fill given space: borders and surface covering: principles of arrangement: repetition: alternation: cumulation: radiation: symmetry.

34. THIRD YEAR.

"CONSTRUCTIVE DRAWING. (*Draughting*).—Machine drawings, tracings, and blue prints made from blackboard and note book sketches: drawings of steam engine and electric motor to be used in the 'projects' in the shops: isometric drawing: ornamental coloring and India ink shading with pen and brush: designing of screw threads, gear wheels and parts of machinery, from specifications: plotting of irregular mechanical movements.

REPRESENTATIVE DRAWING. (*Free-hand*).—Advanced free-hand drawing from models, casts, natural and historic form: light and shade: coloring: Elements of linear perspective and the perspective of shades and shadows.

DECORATIVE DRAWING. (*Designing*).—Geometric, historic, and conventional forms, made from models, and conventionalization of natural forms: decorative and repeated

pattern and repeated forms: planning of ornament. Applied design: analysis of colored designs: original designs in color and relief."

35. DECORATIVE ORNAMENT.

Ornament may be classified as surface or flat ornament, and relief ornament. The former is the industrial application of the fine art, painting. The latter is the application of sculpture to industrial purposes. In surface ornament we attempt to convey the ornamental character of the subject by outline and color. In relief ornament, the ornamental forms are raised from the surface of the object decorated. Of the two, relief ornament is the greater, as it requires more originality and greater skill to produce it.

Ornament is employed in the decoration of works of art, and in the art industries. It is most frequently applied in architecture, and in manufactured articles and vessels of use and beauty. The forms which serve as patterns for ornament are found in plants. The human figure and the animal form is used symbolically, and only occasionally in a constructive manner.

The first principle to be observed in decorative design is, that it must be subordinate. Whenever decoration asserts itself, and hides the principal form, it offends against good taste.

A second principle in all decorative design is that it must promote and further its proper effect. It must be in harmony with it. It must have a meaning, contain an idea: it must be significant.

A third principle to be observed is, that the treatment of the subject must be according to the nature of the material used. In stone or cast iron, the general form or outline of the ornament need only be given: while in marble or terra-cotta, a more delicate treatment of the subject, almost imitating nature, might be attempted.

The characteristics of the different styles can best be learned by the study of good examples. Want of space prevents me from giving more than a brief outline of the great styles.

36. HISTORIC STYLES OF ARCHITECTURE.

The great historic styles of Architecture are: the Egyptian, the Hindoo, the Chinese, the Grecian, the Roman, the Byzantine, the Moorish, the Gothic and the Renaissance. Each of these styles is characterized by the manner in which the inhabitants respectively cover or roof areas, or spaces. The Egyptian built gigantic pyramidal structures of solid granite and sandstone. The Babylonians used clay and bitumen in their structures and developed a style peculiar to their country. The Chinese architecture is of the tent type. Hindoo architecture

shows the use of the arch, not radiating as in the Roman and Gothic, but formed by stones laid flatwise and overlapping each other like inverted steps. The horse-shoe arch is found in Moorish architecture. The Greeks covered their openings with a flat stone; the Romans with a circular arch; the Goths with a pointed arch composed of circular segments. The difficult problem of providing supports for coverings to doorways, to passages, to compartments, as well as to the whole interior of the structure, gave rise to the different styles of columns, entablatures, and gables. In Grecian architecture we have the three orders: the Doric (Fig. 3301, 3304), the Ionic (Fig. 3305, 3306), and the Corinthian (Fig. 3300, 3303), the characteristic features of these orders being found in the column and its capital. (Page 31). The Corinthian was the most beautiful of the Grecian orders. Two other orders, the Tuscan (Fig. 3307, 3308), and the Composite (Fig. 3299, 3302), were used in classic architecture.

37. HISTORIC ORNAMENT.

Greek ornament was not symbolic like the Egyptian (Fig. 3170), it was purely decorative and can hardly be called constructive, as the ornament forms no part of the construction. The ornament in the Corinthian capital is merely laid on. It is, however, pure, chaste and rich. The Greeks were great students of nature and followed the three laws of nature: 1. Radiation from a central point; 2. Proportional division of the surface; 3. Tangential union of lines.

Some of the choicest ornaments of classic Greece are represented in Figs. 3320, 3321, 3323.

The Romans were lavish in their decoration. From the base of the column to the top of the gable every part of the facade was profusely decorated. The ornament forms no part of the construction. The ease with which the acanthus leaf was applied everywhere, caused them to leave the decoration of surfaces in the hands of persons without artistic taste. We refer to Figs. 3326, 3327, 3328, 3329, as fine examples of this style.

The Trajan column with its gilded reliefs on colored ground (Figs. 3558, 3563 to 3581), was embraced within the gigantic structure, the Basilica Ulpia, the principal building of the Forum of Trajan.

The Byzantine ornament was developed by Greek artists out of Christian symbolism. The great features of the style are the circle and dome, the round arch, and all the various details of forms which are derived from the lily, the cross, the nimbus and other symbols. In this style of ornament appear elliptic forms, sharp pointed leaves, unbroken leaf-work without flowers. The finest examples are from the mosque of St. Sophia at Constantinople, and the church of St. Mark at Venice. (Fig. 3316.)

The Romanesque is the modification that took place in the classic style in the Western Empire, principally in the

countries north of the Alps, under the influence of the so-called Gothic races.

The best examples of Moorish ornament are from the Alhambra in Spain. Figs. 3283, 3284, 3285, and 3287 are examples of this style.

The Gothic style flourished from the middle of the 12th to the middle of the 14th century. It originated under the influence of the rich architectural monuments of Normandy, Burgundy and Provence, and spread rapidly to England, Germany, Italy, Spain and the Scandinavian countries. In its purest or highest state of perfection, it is marked by geometrical window-tracery (Page 23), richly ornamented door-ways, delicate mouldings, and elaborately carved imitations of leaves, as of the vine and oak, often conventionalized, but not unfrequently copied from nature. Fine examples of this style are to be found in the Cathedral of St. Denis, near Paris; Cathedral of Notre Dame, Paris; Cathedral of Chartres; Cathedral of Rheims; Cathedral of Amiens: the latter is considered as representing the highest degree of perfection which the style has reached. In England: Cathedral of Canterbury; Westminster Abbey; Cathedral of Exeter; Cathedral of York. In Germany: Cathedral of Cologne, and the Church of St. Stephen in Vienna. Figs. 3235, 3066, 3067, 3068, 3070, 3297, 3311, 3312, 3319.

The Renaissance style was developed in Italy at the close of the 15th Century. At first the classic Roman ornament was carefully reproduced, but through the study of nature new elements of decoration were introduced, until a rich and elegant style was produced that affords excellent examples for study to the art student. Fine examples are found in St. Maria dei Miracoli in Venice; Cathedral of Florence; St. Peter's, Rome: in France, the Tuileries: parts of palace of Fontainebleau; Chateau of Versailles.

Examples of this style are scattered through the pages of this book. We can only refer to Figs. 3322, 3329, to the capitals on page 31 and to the index.

38. THE INDUSTRIAL ARTS.

We have frequently referred to the art industries in these pages, and it may assist the student to a better understanding by naming some of them. They may be classified as follows: 1. The art of working the precious metals—gold and silver. 2. Work in bronze, copper and iron. 3. The art of enameling. 4. Artistic furniture. 5. Carving in ivory. 6. The ceramic art. 7. Manufacture of majolica. 8. Glass making. 9. Glass painting and glass mosaics. 10. The ancient art of mosaics and inlaid work. 11. Book decoration. 12. Ancient armor and artistic arms. 13. Textile fabrics. 14. The manufacture of lace. 15. The manufacture of artistic wall-paper.

39. THE FINE ARTS.

The Fine Arts are architecture, sculpture, the plastic art, painting, the graphic art, music and poetry.

The Graphic Arts may be classified as drawing in the different mediums: water monochrome; oil monochrome; pastel; tempera; fresco; painting in oil colors; painting in water colors; painting on tapestry; wood engraving; line engraving; aquatint and mezzotint; lithography.

The Plastic Arts may be divided into the arts of cutting or carving in marble and stone; modeling in a plastic material; producing metal casts from the plastic material by founding; ornamented metal work formed in relief—*repoussé*; gem-engraving; die-engraving or die-sinking; wood-carving; the art of preparing moulds and casts in plaster, wax, etc.

Modeling.

BY CHAS. F. ZIMMERMANN.

MODELING in a plastic material, when considered as a means of manual training, possesses the highest value as an element of culture. If the aim of manual education is to develop skill in the learner to shape material according to a certain design, it is most easily accomplished by using some pliable substance which can be made to assume the desired form.

On account of their great plasticity, clay and wax have been used in the plastic arts more than any other substance. Work in wood, metal, or stone is more difficult, requiring more time and more tools. Those who can model in wax or clay are prepared to work in harder materials; the skill acquired in handling the few and simple tools, the power gained of thinking in a solid, and of executing the design in a relatively short period of time, the cultivation of the taste of the modeler—all stamp modeling as the basis of manual education.

We are still laboring under the delusion that modeling is a difficult art, and that it should not be attempted until the pupil has learned to draw well. We forget that man successfully modelled in clay and carved in wood and stone before he intelligently expressed his ideas by drawing. In the industries, and in industrial-art education in Europe, this has long been recognized. In the wood-carving schools of Nurnberg, the students are expected to devote themselves exclusively to modeling for one-half of the first school year. In the industrial art school at Stuttgart, modeling is made the basis of instruction in the different arts. As a complement of drawing, modeling has already found its place in the common schools of Europe as an additional aid in the industrial education of the masses. The time cannot be far distant when by the addition of modeling to our schools, some of the executive power of our children will receive greater development.

The English Commission, already referred to, recommended the introduction of modeling into the schools in the following words:—

"We are of the opinion that more attention than has hitherto been devoted to it should be directed to the subject of modeling in the elementary schools. . . . Modeling is an exercise of great importance to the future workmen, and its rudiments can well be taken up, as in continental schools, at the earliest age."

Violet le Due says:—

"Whoever knows how to draw must be able to model; and, when one perfectly conceives a form, it is no more difficult to render it by the aid of the chisel than by a pencil: one must therefore accustom himself to freely use either. . . . One cannot draw an object well, unless one is able to model, shape and fashion it, and to supply what drawing gives only after much time and labor, and many explanations."

Modeling in clay is a practical art and depends on the experience and skill of the modeler. In the following pages we can only give an account of the nature and uses of the tools, the necessary consistency of the clay, and some description of the processes employed in the art.

2. EARLY BEGINNINGS IN THE ART.

"The name of the Sikyonian potter Boutades is connected with the introduction of this branch of art: it appears to have been in the middle of the seventh century B. C. that he ornamented the acroteria and antefixes of the temple roof, first with low-relief (prostypion), and then with high-relief (ectypion). He also left a portrait panel in terra cotta, shown in the Nymphaion of Corinth until the destruction of that city as the first work of its kind. In connection with it was told the pleasing anecdote that the daughter of Boutades, in taking leave of her lover,

sketched his shadow upon the wall with charcoal, the father afterwards filling out the outline with clay and burning the relief thus produced. Neither of these accounts are of great direct value, but that a potter could achieve a lasting reputation as an artist may perhaps show that modeling in clay had already made essential progress, and thus prepared the way for brass-founding, which requires an original and mould of this more plastic material." Modeling seems to have sprung up naturally in all parts of the world; its origin must be sought in the imitative faculty of man.

"The Greeks were for a long time satisfied with modeling figures in clay, and decorating them with colors in a rude and conventional style; from this they passed to images cut out of soft stone, or even marble, still retaining, and always to the end retaining, the practice of modeling and moulding in clay. The next steps, perhaps, would be the painting of rude figures on tiles, as votive offerings or as trade insignia, and along with this the decoration of pottery would be carried on. This decoration answers in simplicity to the unstudied and rude shapes of the early pottery, often borrowed from natural forms of shells or gourds. From this archaic system of decoration, and these squat and ungainly forms, we pass by slow stages to more symmetrical and elegant shapes, and to a richer and more varied ornamentation. No doubt, in time, as our knowledge comes to be more extended, we shall trace many of the principles, practices and discoveries which we now attribute to the Greeks, and which the Greeks, in their time, attributed to themselves, to earlier civilizations, to the Egyptians, Assyrians, Indians, and perhaps to peoples still further east. But the glory will still rest with the Greeks—no matter what revisions of history future discoveries may force upon us—that they threw off their swaddling clothes and went from one advance to another until they had reached the perfection that in all the arts has made the types and standard of excellence. The names of Polygnotus, Zeuxis, Parrhasius, Apelles, and Protogenes are those which have come down to us as the chiefs of Greek painting: but such men were only possible on the condition of a wide-spread preparation for their coming by multitudes of painters and abundant employment; and to maintain their art at a high level they must have been surrounded by an atmosphere of general talent and achievement in which alone such gifts as theirs can come to flower and fruit."—*The Chautauquan*.

"But it was probably many centuries before there was anything like precision of execution, or correct anatomy, such as we see in the golden age of Greek statuary, of which Phidias and Praxiteles were the exponents. These artists conceived ideal types for the representation of the special characteristics of gods and heroes, and spoke as much to the mind of the beholder as to his eye. To

understand their statues we must follow the mind of the artist and trace the idea he meant to convey. We must contrast the dignity of Hera with the gravity of Pallas, the chaste sprightliness of the maiden Artemis with the insinuating attractiveness of Aphrodite, the beauty of the young Apollo with the effeminacy of the young Dionysius, the manliness of Ares with the power of Zeus, the joviality of Silenus with the mischief of Eros. It is just in their misconceptions of these ideals that restorers of statues have failed so lamentably: it is the want of this conception that makes us unable to distinguish a good statue from a bad one, and that leads an uneducated eye to despise a beautiful torso as a mere stone fragment, the useless encumbrance of a gallery."

3. SCULPTURE IN THE ROUND AND IN RELIEF.

Sculpture in completely solid form imitates the original in the three dimensions of length, breadth and thickness, either on the same scale or reduced. But when the work reproduces the proportions of the original in two dimensions, length and breadth, and the third, depth or thickness in a diminished proportion, we have sculpture in relief. Works in relief are of three kinds: Alto-relievo, (high relief), mezzo-relievo, (medium or middle relief), and basso-relievo, (low relief). Statues, groups, busts and vases, are examples of sculpture in the round; while works in relief are usually for the decoration of works in architecture or sculpture.

4. TOOLS USED IN CLAY MODELING.

The tools called modeling tools are made of boxwood, dogwood, beech, maple or any hard-grained wood. They are also made of bone, ebony and wire. Experienced modelers use their fingers more than they do their tools. Tools have been invented to aid the fingers, and are designed to do what they cannot perform. Wire tools have loops of various shapes and sizes, round and angular, and fixed into wooden handles. The wire tools are most useful in the folds of draperies and in close or narrow concave surfaces. Those used for denting or pressing have rounded edges; for cutting, sharp edges; and for scraping, serrated edges. The broad notched tools are designed chiefly for working the large convex masses, or large folds in drapery. Great care must be exercised not to retouch work already done with a tool while clay is adhering to it. (See modeling tools on pages 82 and 83). A piece of wire is used for cutting larger masses of clay. A vessel containing water, a brush for sprinkling the model, a dampened sponge for moistening tools and fingers, and wet cloths for covering the work, are important necessities.

The simplest modeling stand is made of boards, placed obliquely at an angle of about 60 degrees upon a second

board or upon the table. The top board is supported at the back. By painting the modeling board it can be kept from warping. (Fig. 1001.)

The modeling board for reliefs is made of a strong wooden frame, in which are fixed narrow cross-pieces to prevent the board from warping. By nailing a narrow frame inside of the first, it can be made a shallow box. (Fig. 1003.)

The large modeling stand (Fig. 1005,) having a top turning on a pivot, and the easel (Fig. 1006,) can be easily constructed. Wood and wire modeling tools and a pair of modeler's calipers, for measuring proportions can be obtained of the C. Hennecke Co.

5. MODELING CLAY.

It may safely be affirmed that without clay the sculptor's art could never have reached the high plane which, by its use, it has been enabled to gain. The clay known as potter's clay is used in modeling. If the work is to be used as a model, the clay can be highly plastic, but if it is to be fired, it must be made more porous by the addition of sand. All clays shrink by firing, the shrinkage varying from $\frac{1}{4}$ to $\frac{1}{4}$ on the exterior, and from $\frac{1}{8}$ to $\frac{3}{8}$ internally, according to the amount of moisture in the clay prior to firing, and length of exposure. Clay, as found in nature, is rarely fit for use; it must be thoroughly worked, freed from all impurities, pebbles and gritty substances, and exposed to atmospheric action for a long time. It is best to get your supply from the potter, where you can at the same time determine its character from the quality of his wares. If it is in a moist state, keep it so by frequently sprinkling water over it; if it is dry, break it up into pieces of the size of a nut, saturate it, and then knead it until it is fit for use. Keep the clay in a covered vessel, to prevent evaporation; a zinc-lined box, a jar, or a pail will answer.

When ready for work, the clay must be so wet that it will not stand in a mass much higher than its own width without support. The clay adheres much more to the tools when wet, but it is at the same time much more easily and quickly worked.

6. MODELING FROM A CAST OF ORNAMENT: THE FOOT, HAND OR BUST.

Having selected a simple cast for your first effort, place the bench, table or modeling stand under the window, or let the light fall on it from the left side. Make a ground for the figure. Use the toothed tool to scrape the surface even and flat. By nailing thin pieces to the side of the table or modeling board, and drawing a piece of wood across the thickness of the clay, ground can be made even. When laid flat upon the table, determine where the figure is to

be placed, and make deep cuts crossing each other in the ground, roughening it, and press clay on the ground thus prepared. Press the clay with some force so as to incorporate the pieces well with the ground. Give the figure the exact form, removing clay on all sides.

The actual modeling is done by hand alone, the thumb and fingers pressing the clay, giving it the general form. The midrib and other ribs in the leaf form are worked out by the aid of the tools. Remove the clay from the middle to the edges, scraping it away with the tool. Hold the tool nearly horizontally, the points of the four fingers resting on it, and the thumb supporting it on the under side. While at work keep the clay of the consistency of putty. In joining two pieces smooth the surfaces that are to be blended; the clay that is applied should be softer than the work itself, as it stays in place better. Do not keep clay in the hand any length of time, as the moisture evaporates rapidly. In modeling the hands, feet, or bust, block in roughly in large, broad, square planes or flats, leaving the details until later. (Figs. 3948 to 3959). Sprinkle the work frequently as you proceed. A plasterer's brush is the best instrument for this purpose. At night, or when the artist is not at work on the model, it should be covered over with a wet cloth or sheet. It can also be kept moist a long time by covering the model with an oil-silk bag.

7. SUPPORTS FOR THE CLAY.

It is very important that the supports for the clay be properly attended to, else the fruits of months of labor might suddenly break to pieces through its own weight. The supports of a full-length figure are shown in the illustration (Fig. 3990). Such a figure is usually modeled upon a bench or stand about thirty inches high and thirty inches square. For a bust it must be much higher (See Fig. 3992).

Above this stand is placed a revolving plinth. This is necessary to enable the sculptor to see his work on all sides in any light, and it enables him to work on all parts in one spot, or in the same light. On the center of the plinth there should be bolted and firmly fixed vertically a strong iron bar, about the height of a man, and from about six to ten inches in circumference, according to the weight of the figure. In loosely draped figures it is necessary to fix a vertical beam of wood to the main iron bar; for though the bar will keep the clay perpendicularly in its place, it does not keep the mass of clay from sinking. We shall not be surprised at this when we consider that the quantity used in some figures, even of the heroic size only, amounts to about two tons. Two cross-pieces of wood are fixed to the main bar at the shoulders and the loins, from which the supports of the arms and legs must be started, and a third piece may be

fixed in the middle to diminish the weight of the clay. The supports of the legs must be bars, straight or bent, according to the position of the legs; but the supports of the arms, when not detached from the body or drapery, may generally be made of twisted thick copper wire, small pieces of wood being twisted in with it at short distances, and at right angles. The fingers, if separated, will require similar care. The clay should be built up against this complete skeleton of supports, and be sufficiently strong not to yield in the least to the weight of clay when the model is finished. The building up of such a skeleton for a figure of the heroic size is often the work of a week or more. The amateur should have the assistance of some one experienced in such work, to construct the skeleton of supports for him. If the arm is to be slightly elevated and detached from the figure, the support can be so made as to allow its removal at pleasure. This will give the sculptor a better opportunity to work on the model beneath the arm, and diminish the risk of injury to it. The contrivance necessary is a pipe or tube in the shoulder support, which can receive and hold firmly the skeleton support of the arm made of either wood or metal.

The supports necessary for modeling a bust are an upright piece of wood with a cross-bar at the shoulders. A small cross-bar at the head, or a piece of lead-pipe, would be of service. (See Fig. 3991.)

8. HOW TO MAKE A MOULD.

We would advise the amateur to begin with the model of a cast of ornament, or of the features, as easier to experiment upon than a bust or a figure, and with less danger of spoiling the work of weeks of toil.

Make a border or wall of clay all around the form. It must be half an inch higher than the highest part of the figure. The model should now be brushed with clay-water, or soft soap and oil—a soft brush being used. As the moisture or oil is absorbed, repeat the brushing with these materials. Now pour water into a basin and throw in plaster of Paris. Stir with a strong stick or common table spoon. See that the plaster does not form in balls, but is well mixed with the water. The mixture must be perfectly smooth and of the consistency of cream. The basin should have a lip to pour from. Pour rapidly and allow it to spread over the whole surface. Shake or jerk

the model so as to cause the plaster to fill all the recesses of the model. Clean the basin immediately, before the plaster hardens in it. In about ten minutes the plaster has "set" sufficiently to allow the clay wall built up around the model to be removed. Now level the surface of the plaster with a wire tool and leave the mould until the next day when the plaster will be found to be hard. Carefully insert a broad and thin blade between the model and the mould, and separate them. The mould will be found to be an exact copy of the model.

9. HOW TO MAKE A CAST.

Clean the mould and allow it to become thoroughly dry by placing it in an oven over night after the fire has gone down, leaving the door of the oven slightly open. When the mould is perfectly dry, give it two coats of linseed oil, or more if the plaster will absorb it. Build a wall of clay around the mould, or nail strips of wood together so that the sides shall be $\frac{1}{4}$ of an inch higher than the highest part of the mould. Mix plaster and cover the mould making the surface at the top even with the border strips. When the cast is well set, the mould may be carefully broken off in fragments, and the cast exposed, the complete and finished work of the modeler.

When a mould is taken of the bust in clay, it is made in pieces, that is, one part of the bust is covered with plaster at a time, and allowed to set. When these parts or pieces are fixed and dry, the whole may be separated at the joints, without any regard to the preservation of the clay model, for when the mould is complete, the model is no longer of any value. The clay having been removed, the component

parts of the mould are again put together, and in place of the original clay it must be filled with plaster of Paris. Only a small quantity is at first poured into the mould, and shaken to allow the minute recesses to be filled. The pouring of the plaster and the shaking of the mould is repeated a number of times until the plaster form is of sufficient thickness. The parts of the mould are now removed and the perfect bust is exposed to view.

"Many sculptors have their clay model cast in plaster before the modeling is quite finished, as they prefer to put the finishing touches on the plaster cast,—good plaster being a very easy and pleasant substance to work on."



10. HOW A STATUE IS MADE.

Harriet Hosmer describes the process of making a figure in marble as follows:—

"A vague idea prevails as to how a sculptor works out a statue. The truth is this: The artist puts the conception as nearly as possible into a material form by the aid of clay. A plaster cast is then taken of that. By this time deft mechanics have a block of marble, square and out of mind, in the most perfect manner. Then the cast is set alongside, and by means of square and rule and callipers, the model is copied point by point. The mass is hewn from the block rapidly until a general outline is reached. Then the mechanic proceeds with more skill and care, and gradually reduces it until the exact image of the original model is reached. Then a still more skilful artisan undertakes it, and does almost marvels under the artist's personal direction. At last the artist puts on the finishing touches, which give the individuality, the excellence, the semblance of the person modeled after, or which conveys the idea that the artist has fancied into creation. A statue, like other works of art, is but a vehicle, as it were, to transport the thought that generated in the artist's mind, and was modeled and rounded



THE MODEL.

model is multiplied in the larger figure, causing the sculptor much labor to rectify errors in the full-sized marble work.

Clay models can be baked or allowed to dry, and then used by the sculptor as models to work from. But clay in drying shrinks, and is apt to crack, so that the model does not preserve its shape as originally modelled. The ancients used terra-cotta (baked earth) figures, as also baked moulds of clay, forming their casts by pressing clay into them.

12. MODELING IN WAX.

A beginning can be made with some hand-made tools, a slate or pane of glass, a lump of modeling wax and a cast. Wax as a material is to be preferred for certain kinds of work, as it is always ready for manipulation, clean to handle, and adapted to small work: in this material work can be carried on throughout the entire year without danger of spoiling the piece by exposure to cold, or from want of proper attention on the part of the learner, as would be the case in clay modeling.* Modeling wax can now be obtained at a price that brings it within the reach of all, and the same piece can be repeatedly used without its deteriorating in quality.



AS "TREATED" BY SCULPTOR.

into a perfection by his perseverance that delights esthetes and others in proportion as they understand it. These finer touches can be done by none but the designer, for he cannot in truth others what he wants. A faint character in a delicate lineament, a slight indication of a line, will make or mar by imparting an expression desired or not. So the artist must take the chisel and study and carve and carve until the block is the incarnation of the thought suggested in the artist's mind.

14. THE CAST.

If possible, the student should make a model of the figure to be modeled. This can be done in clay or wax.

The first exercises in the manipulation of this material are in rolling, pressing or molding the geometrical solids, using the hands only. Simple objects based on the geometrical solids may next be attempted, using the fingers and the simplest tools. The amateur may imitate casts of ornament, fruit, flowers, foliage and the details of the human figure. The form of the object is drawn on the modeling board, slate, tin, pasteboard or glass, slate and glass being preferred. A small piece of modeling wax is rolled in the hands, giving it a cylindrical shape 1-16 to 1-8 of an inch in diameter, and firmly pressed upon the slate following the outline drawn. The figure is filled in

* On page 80 we give a description of a new material and its value in modeling.

in the same manner. Build upon this foundation layer by adding bits of wax, pressing each piece down firmly with the finger or the tool. Keep a small sponge slightly wet, to which the tips of the fingers or the end of the tool can be occasionally applied, as this will facilitate the work. Proceed in this manner until the subject is finished.

Modeling in wax was practiced in ancient times, for there were modelers in wax in Athens as well as sculptors in marble; and in the European museums are found statuettes and medallions made by the great artists of the Renaissance.

13. TERRA-COTTA IN THE ARTS.

The use of terra-cotta for decorative purposes in our country is quite recent, its manufacture is now one of the chief art industries. The country within a radius of ten miles around Perth Amboy, N. J., supplies the best clays for that purpose in the United States. There are manufactories of terra cotta and of tiling for building purposes in the vicinity of Boston, Mass., in New Jersey, in Ohio, near Washington, D. C., and at Chicago. Common terra cotta is made of potter's and fire-clays, mixed with white sand, alkalis and "potsherds" (*i. e.* old fire-brick and pottery pulverized), which act as vitrifying elements, counteract excessive shrinkage, make the ware harder and keep the color lighter.

"We have in the United States begun to use tiles, both glazed and unglazed, associated with brick and stone in buildings. But these tiles are mainly imported from England and are very expensive, so that they are sparingly applied, and looked upon as a luxury. There is every reason why the production of these tiles, and other manufactures of terra cotta should be carried on to an unlimited extent in this country. We have the necessary clays. They are to be found East and West. Skilled labor will come with the demand for it. Perhaps no other art industry has received so great an impetus from the splendid Exposition of the works of all nations at Philadelphia, as that of pottery. Tiles and other forms of terra cotta can be manufactured at low cost, and will be extensively used as building material. The use of terra cotta is to be commended because of its indestructibility from extreme heat or cold, and from the chemical agencies which attack other materials. In its condition as clay it is easily modeled and moulded to any shape, and would serve a graceful purpose for cornices, caps for windows and doors, string courses and so on. But its adaptability to effects of color commands our special attention. In this respect it offers limitless opportunities for artistic expression. Color once fixed by heat in the plastic clay endures forever. Color is the grand objective of all the arts and industries."—*George Ward Nichols.*

14. USE OF TERRA COTTA IN ENGLAND.

"Most of the old terra cottas have been moulded in clay solidly, and then burnt. That is not the best way; for clay shrinks in burning, and in proportion to its thickness, so that a thin part does not shrink as much as a thick part; thus distortion takes place.

"I have seen a terra cotta which had been burned for two days, and had only shrunk one-sixteenth of an inch in two feet in height; and that is practically nothing. To attain that perfection, two things had to be done; first, the statuette had to be hollow, and all parts of the same thickness, which was done by first modeling the figure, taking a mould of it, and then pressing or squeezing the fresh clay into a plaster mould, after being rolled to an even thickness of a quarter of an inch; second, the greater portion of the clay was composed of ground and pulverized burnt clay, in the shape of common clay tobacco-pipes already burnt, and which had therefore been already shrunk, so that when burnt again it did not shrink at all; the actual shrinking being in the unburnt clay necessary to bind the particles together. The result was imperishable work, clear and brilliant, every touch of the master's hand sharp and perfect; and, with such care, terra cotta is a beautiful material.

"It is usually regarded as a material for small things only—sketches and details; but I have seen a life-size figure made as I have described, and burnt without a crack or a flaw.

"The most notable examples of the use of terra cotta in modern days, is in the construction of the permanent portion of the South Kensington Museum in London. Every fraction of the facade in a sort of Venetian-Renaissance style, is built of burnt earth—the main body of red brick, the enriched portions of cream-colored terra cotta. . . . The columns, which are richly covered with figures emblematic of the seven ages and of the arts and sciences, in relief, are in blocks several feet in length and diameter, and the string-courses and mouldings, and wherever the main color of red brick is relieved by the lighter colored terra cotta, there are immense blocks of the material as straight and square as worked stone; while the surface is as hard as cast-iron, non-absorbent, dead in surface, and almost of uniform color; where the color is varied, the variety is not so great as in the veins of white marble.

"Altogether it is a brilliant success, and it has these advantages: the miserable climate and dense atmosphere of London cannot defile it, for the surface is hard and smooth, and every storm of rain, and every gale of wind remove impurities as they would from a white plate; and fog and rain are not altogether unknown in the largest city in the world. I examined these terra cotta enrichments in September, 1871, after they had been exposed for sev-

eral years, and they were as fresh as on the day of their erection; whilst stone work that had been up as long was as black as the inside of a chimney.

"The clear atmosphere of this country, and the absence of a plethora of mill-chimneys, do not so loudly call for permanent and cleanly decorations of buildings as London and Manchester do in the old country; yet, here as there they would be an honest and pleasing ornament,—art work and hand work, fresh and eternal."—*Walter Smith.*

15. PERMANENCY OF TERRA COTTA.

"Encaustic tiles, which are another form of terra cotta, display every color known in art, except gold and silver; and their colors no possible condition of the atmosphere can destroy. Even when the earth is consumed with a fervent heat, these tiles and the Greek vases will be left behind us as a permanent record of past civilizations. You may reduce all the pictures of the world to tinder; melt all the bronze statues until they run in the gutters; calcine the marble statues into plaster of Paris; burn all the buildings into lime, and all animal creatures and vegetation into ashes; and all this while terra cotta will glow red-hot, and remain uninjured, and cool down again into

the shape we fashioned it. It is the noblest of all vehicles for the expression of art. It may be difficult to decide what else it is we do which would be even comparatively permanent in any great universal shock or a relapse into barbarism."—*Walter Smith.*

16. USES OF TERRA COTTA IN THE UNITED STATES.

In this country fine examples of architectural enrichment in terra cotta are found in the buildings of the Brooklyn Historical Society, the Produce Exchange, Cotton Exchange, and Lawrence Building, of New York; the Broad Street Station of the Pennsylvania Railroad in Philadelphia; the State House at Trenton, N. J.; the Boston Museum of Fine Arts; the New Pension Building in Washington; the Pennsylvania Museum and School of Fine Arts, Philadelphia; the Metropolitan Museum of Art and the Stanton Street Baptist Church, New York.

Much valuable information about this branch of industry and its growth in the United States can be found in Mr. Isaac Edwards Clarke's fourteenth paper on Art and Industry entitled *The Present Outlook*. These papers form a part of the large and valuable report on *Education in the Industrial and Fine Arts in the United States* published by the Government Bureau of Education.

Clay Modeling.

BY LORADO TAFT, SCULPTOR, INSTRUCTOR IN CLAY MODELING, CHICAGO ART INSTITUTE.

THE tools and materials required for amateur sculpture are so simple and inexpensive that any one possessing a taste for art work can afford to make the experiment. Three or four small sticks of hard wood properly flattened and curved, a wire tool (made of a pencil and a hairpin if necessity requires), and a handful of modeling clay or modeling wax. Here is your outfit for making medallions and small reliefs. For larger work, more clay is needed.

One of the great charms of this study is the pleasant surprise that comes to each one who finds that he really can do something. In modeling, this surprise is not reserved alone for those who have become proficient in drawing. Although the highest success in sculpture is vouchsafed only to the student whose eye has been thoroughly trained in drawing from casts and from life, my experience with pupils has led me to recognize the fact that many entirely untrained in that direction are gifted naturally with a correct sense of vision and a sense of proportion which enable them to execute nobly both pleasing ideal heads and more convincing portraits.

The explanation of this is, of course, too, lies the reason why every child is so full of pictures; the child's

education, the use of pencil and paper,—in the drawing we have at best but a *translation* of the object. The problem of flattening a visible solid on to paper and representing all its relief and irregularities by the thickness of a pencil line, is not the simplest thing in the world. The picture is another language, a conventionalization of an idea. The reproduction in relief is an infinitely simpler process. Whatever the older student's advantages in manual dexterity and training of the eye, even the youngest can see or may be made to understand that a cube is square in all directions and a globe round, all round. I have discovered that some full grown people of average cerebral capacity can never succeed in understanding those retreating lines in the perspective drawing of a cube, or having once learned their radiating design, will persist in drawing all cubes by the same formula, exactly alike, whatever their point of view.

It is astonishing how many things we think we know, and yet do not! That is, we do not know definitely, when put to the test. Facts of science, events of history, with which we fancy ourselves perfectly familiar, become most exasperatingly Will of the wisps when we try to give a detailed, connected account.

The same experience awaits the beginner in art work. He may imagine that he knows what an ear is like, or a mouth, but even with the model in view a few minutes' attempt generally satisfies him that "making faces," is not all fun. More than a few have surrendered before a simple model of a nose, while the intricacies of the human ear invariably bring despair and crushing defeat. Of course all succeed in getting something of a semblance. You can tell which is "which." Yet the teacher if churlish could truly say, there is nothing right about them. The backward incline of the plane or axis of the eye, those firm buttresses of flesh that support the lower lip, the strong bony foundation revealing itself in the jaw, and giving character to the forehead; the broad, full muscular forms everywhere blending into each other, but never scooped out into a concave; the little accents here and there marking interstices between the muscles or cords and tendons; the thousand and one things that a sculptor sees in a good cast, are generally overlooked and always imperfectly rendered, because the pupil either does not see them at all or does not recognize their importance.

Believing that there is nothing quite so valuable as definite knowledge, and working upon the principle that when a pupil has become familiar with the different portions of the face, he can put them together, I generally begin with large casts of the individual features; the mouth, nose, etc. If one be so fortunate as to have good clear-cut models, he will be able to work with profit on one of these features as long as he might otherwise on an entire face. Very often the teacher will hear, "I don't see anything more to do," when he himself can see as yet hardly anything done.

One of my favorite models for beginners is an eye, cast full size from Michel Angelo's colossal David. I never look upon that mighty translation of nature without a feeling of awe. It is a privilege to trace the master's very touch in the firm forms of those eyelids and of the imperious brow. There are several other casts from the same head, all valuable for the first month's practice,—and for reference every succeeding month.

About this time the budding Praxiteles aspires to make a medallion of some revered grandma or to model a bust of a baby. In extreme cases there may be a whispered wish to "try the marble." My own pupils are always recommended to wait, but for the self-instructed student there is no escape, and a great deal of time will be wasted on impossible copies of retouched photographs, and on caricatures of unhappy babies with the secret of perpetual motion in their little necks. Better wait until you are sure of your touch before attempting these—to you now—impossibilities. Whatever the friends say, the work cannot be good until you have some idea of the construction of a head. You may not kill the baby model but you are sure to ruin your temper.

The process of modeling is theoretically just the reverse of carving. The marble cutter releases the head or figure from the block, always cutting away until he comes to it. The modeler constructs—builds up; always adding on, and only cutting into the clay for the little accents which give color to his work. For this reason the development of the copy should almost reveal a cellular growth. As it is impossible to form that eyebrow (of the head of David) at one stroke, we must first build up the larger masses, rudely indicating the form but aiming to accurately render the size and general slope; finding the highest and the lowest points regardless of eyelids, etc. Then having everything located, the work of finishing and adding on the little pellets of clay which give the subtler curves and accents, will be an easy matter. The eyelids are formed of a string of clay rolled between the thumb and fingers and carefully placed, then flattened with a tool.

It is the same old story; "masses first, then details"—the foundation of all art instruction, yet something so incomprehensible in its application, to the beginner.

Take another example, a mask of the Venus de Milo. If you have had no experience with the clay, we will simplify the problem for you. Lay the mask on your modeling board and mark around it. Place it beside the outline, an inch or two away and exactly parallel with it. Take your clay—as soft as possible without being sticky—and fill the enclosure of the pencil mark. You will hardly need to use compasses to measure, because the model and your copy being side by side, you can trace imaginary parallel lines back and forth from one to the other, locating the eyebrows, the length of the nose, etc. If your untrained eye needs still further guarantee, take a straight stick, and lay from one to the other, keeping it parallel with the edge of the board. It will serve the same purpose as the architect's T-square, which sliding over the drawing to be copied, locates at the same time the lines of the new drawing. Your improvised T-square will help you also to fix the heights of your relief. Step back from the table and kneeling, sight across your work; if it is closely correct in thickness, lay the stick across from the brow or nose of the one to the other and mark the slight difference in height.

Mind, you can not do too much looking, if only it be done intelligently. Look at your work from across the room; put the board on the floor, or stand on a chair and look down upon it; view it from every possible direction, but always keep the model close to it and with exactly the same side towards you. Endeavour to make the two silhouettes agree: when they do, from every side, the work is done.

You may object that this is all very mechanical, this use of compasses and stick. I can only say that you will never approach to perfect work without measuring. The greater the artist the more measuring and comparing he does. A

good deal of it has become almost intuitive to be sure, and you do not see it done, but the height and breadth, the "number of heads," etc., are seized upon at the first glance by the masters of drawing and sculpture. Nor do they disdain to measure with the pencil or charcoal stick. It is the hardest work to get our students to use the plumb-line, while those marvelous draughtsmen of Paris would dispense with their charcoal or paper as readily as with the plumb-line. Michel Angelo would never have had the "Compasses in the eye" had he not known full well their use in the hand.

Vary the work occasionally with a study of some other part; a hand or a foot, or if your taste so incline, with a bit of decorative modeling, foliage and conventional designs.

Next comes the making of busts. The equipment required is still so simple that "Every Man His Own Bust-Maker" might doubtless become a familiar announcement if only every man could see straight.

An upright stick an inch or two in thickness securely nailed to a small plank, is required. Through the upper end two small pegs or spikes are driven at right angles to each other. About half way down a cross-piece of wood is nailed. This to support the clay shoulders. Soft clay is pressed around the upper end of the stick and between the spikes, forming the nucleus of the head. Cover the shoulder braces in the same way. Let this harden somewhat and you have a strong foundation for the bust. Now with soft clay continue to fill in. If uncertain as to the pose of the head, do not let the interior clay harden before adding on, and you will be able to twist it into shape. In copying a bust however there is no question as to pose, and the work is more secure with a solid core.

If you have succeeded with the masks, and have done enough of them, you will have no trouble with the bust. The work will have become play. Remember always to keep your model and copy close to each other and on the same level. Compare them constantly and do a deal of walking about.

As to plaster casting, you are bound to lose your first work anyway and to vow momentarily never to touch it again, so I shall not render myself responsible for any of these woes by giving directions that cannot be understood. There is nothing simpler than casting when once you know

how, and nothing more risky for the amateur. The best plan is to experiment on unfinished bits until you are sure of your process.

The mounting of figures, their proportions and construction are too weighty and difficult matters to discuss within these limits. As a hermit inventor may spend years over some ingenious device only to find it long since patented and in use, so many of our home-made sculptors give themselves a world of unnecessary toil. A few months in a good art school would have taught them to do easily and well what they have poorly accomplished after months of labor and many disappointments. There is a great deal of difference between good and bad work, and where the means for conscientious study are offered there is no excuse for viewing bad work complacently, whether it be our own or that of others.

And now a word about original composition. One of the most frequent remarks that I hear from pupils is, "I never can compose; I have no originality about me." There is a bare possibility that this may prove true in your case, but neither you nor I have any right to say it now. You have no idea what you can do until you have given yourself a fair chance. That you are unable to make a satisfactory composition at present we may both concede. Neither can you write a story in Russian, but it may be because you do not know the words of that strange tongue. When we have learned the language of art, then we will begin to consider our story. The average artist is so busy, however, with the language, that he forgets all about the story and talks nonsense. The true artist is scholarly in his tastes, a man who reads and enjoys; who reverences truth wherever found and loves beauty wherever revealed.

The aspirant who finds that he has a hand steady enough and an eye clear enough to learn to draw, who will carry on his other studies at the same time, with the same interest, possesses the qualifications of an artist and need not fear. As he grows familiar with the figure and advances in the study of expression, his reading will bring clearer pictures before his mind's eye. By the time that he is able to give them form they will have grown so vivid that he has but to *transfer* them to the canvas or the clay. They will have become his real comrades, and their gentle companionship a source of great happiness.



The Development of the Vase.

BY JOSEPHINE C. LOCKE, CHICAGO.

FIRST in time and order is the body of the vessel, of which the leather bottle used to carry water across the desert, and the most primitive household utensils that held liquids, supply the earliest suggestion. Egyptian vases and the ordinary earthen vessels of the early historic periods were rather globular in form. It remained for Greek refinement and love of free bold curves



Fig. 2.



Fig. 3.

to transform the less pleasing spherical outline into the more subtle forms of ellipsoid and ovoid. Figs. 1, 2 and 3.

The parts of the most highly developed vase are: body, mouth or rim, neck, foot or base, handles, spout.

Body of Vessel { A. Globular,
B. Elliptical, { Oblong Ovoid.
C. Ovoid, . . { Broad Flat Ovoid.

The Greek Amphorae, Diogenes famous tub included, were based on the broad, flat ovoid.



Fig. 1.



Fig. 4.

The mouth or rim was distinguished by the character of its edges. These were sometimes concentric as in Figs. 4 and 5, sometimes beveled outward as in Fig. 6, sometimes rounding as in Fig. 7. Gradually the neck was introduced bringing additional height and grace to the vessel by

increasing its complexity both of proportion and outline.

The primitive thought of raising a flat vessel by sliding a block of any kind under it, or by setting it in a



Fig. 5.



Fig. 6.

ring of clay, naturally suggested the elevation of the same by means of a foot or base, which in its growth followed much the same genesis as the mouth. We have in Fig. 8. the simple plinth, a section of a cylinder; Fig. 9 the same but outlined by curves curving outward; Fig. 10 the same beveled outward, and finally the double base bounded by the reversed curve Fig. 11.

The development of the foot or base is purely Greek and originated partly in the custom of carrying the vessel upon the head, and partly in the character of the climate, a rainy atmosphere. Water was received from above, hence



Fig. 7.



Fig. 8.

the vessel had to be made so as to stand. In Egypt, where the climate was dry, water was obtained by the lowering of a vessel.

The Egyptian water vessel is usually pointed at the base, and sometimes one handle suffices, extending over the entire mouth. In Greece the handle was not only used as a matter of convenience and necessity, but also to secure a more pleasing proportion and balance. Frequently vessels were supplied with double handles, one pair for use and another for the purpose of harmony, balance or contrast.

The last and final addition was the spout or pouring mouth, leading to the modern pitcher. In the earlier vessels this was very small; sometimes two or three were used; often the handles were altogether omitted, but more usually, wherever the spout is found, one or more handles also exist.

It will be seen that the addition of each of these parts taxed more and more the ingenuity of the workman and called for nicer and more delicate balance of proportions; but



Fig. 9A.



Fig. 9B.

the body of the vessel, however, remained the chief object of concern; to it all the other parts were subordinated; it was the principal part while the accessories only enhanced its use or its beauty.

Now in teaching, this thought must be borne in mind, and the body of the vessel first carefully studied, both as to the character of its profile curve and the proportion of its height and width.

Such good, clean curves as the Greeks used cannot be obtained by piecing or patching. To draw the outline of a Greek vase with expression, one must draw with a free shoulder movement and lay in the entire body of the vessel with one sweep of the pencil, then add the other parts. It is only when the worker has a clear mental picture of the underlying type form that his result will show feeling and thought. The proportions of the base and neck to the body of the vessel depended altogether upon the purpose for which the object was intended; the use of the vase

invariably came first and decided its construction, and to this the ornamentation was subordinated. So it should be in all modern works. Nothing is good in construction that weakens or interferes with the use of the object. The use determines the construction, and the construction in its turn determines the nature of the ornamentation.

Learn from the history of the Greek vase the following:

I.—Similar ideas proceed from similar conditions, as evinced in the likeness between early Greek and archaic pottery.

II.—Study of form precedes the study of color.

III.—There is an order of growth—a development in pottery and the useful arts in the past has ante-dated a development in architecture, sculpture and the fine arts (or painting).

IV.—The causes which led to the fall of the nation, led also to the deterioration of its art; *i.e.* the degeneration



Fig. 10.



Fig. 11.

of the vase as evinced by its poor construction and its profuseness of ornament preceded the political and social degeneration of the people.

Greek Pottery.

BY CHAS. F. ZIMMERMANN.

IN the following brief essay it is impossible to give a history of the development of the ceramic arts in the great nations of antiquity; we shall rather confine ourselves to a consideration of the pottery of the Greeks, whose works show the greatest excellence among all the oriental nations. When the beauty and simplicity of the forms of their vases is considered, we must acknowledge them as models, even when we apply our standard of excellence. The decoration of the vase, and the painting of story on it, have become a source of information to us in regard to the mythology, history and customs of the people. Of the 20,000 Greek vases in the different museums of the world, the variety is almost as great as the number. They may be classified as relating to mythology, to the heroic age and early Greek history, to known history, and to the manners and customs of the people.

Archaic Greek pottery was of coarse clay, and being made by hand the forms were undecided; it was ornamented by points, zigzags, spirals and knobs. But though made in this coarse manner, we can already trace at an early period, pottery that was more defined and with more symmetry. The ornamentation consisted of winged horses and lions—the forms being pressed into the clay as a flat ornament. We next find leaves and flowers treated with a delicate idealizing conventionalism; the vine, the ivy, the anthemion, masks and festoons being used. No



Fig. 1. Egyptian potter molding a vessel on the wheel. From a painting in a tomb at Thebes about 1800 B. C. (Illustration from Encyclopædia Britannica.)

wheel was used at first. The Greeks trusted to their touch which was more delicate than the technical accuracy of a machine. In Asia, the potter's wheel had long been

known, but the forms of pottery in the oriental nations remained stationary. But when the wheel was introduced into Greece, it brought a new spirit into the handicraft of the potter.

The potter's wheel was in use in Egypt long before it was used by the Greeks. The application of a circular table or lathe, placed horizontally and revolving on a central pivot, was a great advance in the art. As the wheel spun round, the clay could be fashioned into all the combinations of oval, spherical and cylindrical forms.

After the wheel was introduced, a better kind of clay was used and a more uniform color produced. They

made cups, pots, flasks, etc., all being black in color. Some are slightly ornamented with yellowish, or white spots, or with simple lines drawn all around the vessel.

The Greeks claimed the invention of images in pottery. The story of Boutades, or Dibutades, is related on page xxx. But long before Dibutades was born, Phœnicia had been making

great and small images of pottery: and for a thousand years, Egypt had produced figures of gods, men, and animals, in unglazed pottery, or adorned with exquisite enamel.

The ornamentation of vases continued to improve, the paintings of animals, monsters and men being restricted to the bulge, the rings, meanders and floral ornamentations marking the upper and lower parts of the vessel. At a later stage we clearly recognize incidents before the walls of Troy. The Hellenic, or classic style of Greek pottery, based on the Archaic, shows great improvements. The paste is harder, finer and well glazed. The red is

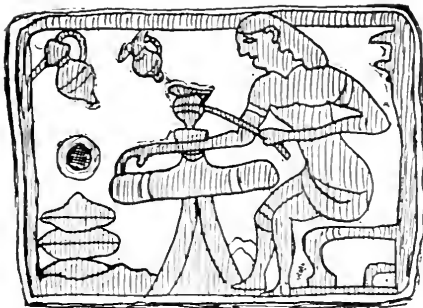


Fig. 3. Votive tablet from Corinth, full size. A potter applying painted hands while the vessel revolves on the wheel. (Illustration from Encyclopedia Britannica.)

bright, the black without spots. The figures are painted with great anatomical accuracy. The Greek potters vied with the sculptors and painters in the production of beautiful works. The decoration consisted of beautiful combinations of frets and garlands, heroes, warriors, gods and goddesses. During the middle of the fifth century, B. C., when marble was introduced in architecture, and ivory in sculpture, we find highly-colored and

richly-decorated vases. The colors used were red, violet and yellow oxides of iron. This polychromatic treatment is seen on some of the smaller vessels and vases known as the lekythus, and on saucers of large dimensions. The outside has red figures on black ground, and the inside has colored figures on white ground. The painting was usually done by an artist, but frequently the potter had artistic ability and decorated his own wares. In contemplating the beautiful products of the Greek potter, we must remember that the drawing was done upon the moist clay, requiring great freedom of touch and unhesitating decision; no mark once made could be erased; the complete line was to be traced without taking off the brush. The vases were painted in an upright position, and the eye of the artist was his only guide.

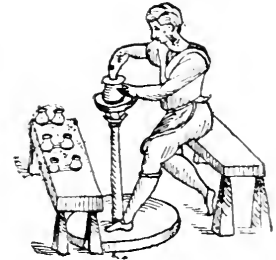


Fig. 4. From a Venetian wood cut of the middle of the 16th century; shows Majolica potter at work throwing pots on the wheel. The potter works his wheel by means of the lower foot-turned disk.

CLASSIFICATION AND DESCRIPTION OF THE VASES OF ANTIQUITY.

The following classification is by Dennis, in his book on *Cities and Cemeteries of Etruria*:—

Class I. Vases for holding wine, oil, or water—*amphora*, *pelice*, *stamnos*.

Class II. Vases for carrying water—*hydria*, *calpis*.

Class III. Vases for mixing wine and water—*crater*, *celebe*, *oeophorum*.

Class IV. Vases for pouring wine, etc.—*amphoe*, *olpe*, *prochous*.

Class V. Vases for drinking—*cantharus*, *cyathos*, *carchesian*, *halcion*, *scyphus*, *eglic*, *lepaste*, *phiale*, *cecas*, *ryhton*.

Class VI. Vases for ointments or perfumes—*lekythus*, *alabastron*, *ascus*, *bombylios*, *argyballos*, *cotylicosc*.

Pithos. The largest object made by the Greek potter was the pithos. It was common also among the Egyptians and Romans. The pithos served the purposes of a cellar, for in it were stored wine, oil, or corn. It was made of coarse clay, had little decoration, and of a size large enough for a man to sit in. Diogenes lived in such a tub. It had no handles. It was usually buried in the ground up to its neck.

Amphora. The amphora was less in size than the pithos. It was usually of moderate size, but some were more than five feet high. The amphora was filled from the pithos. It was used for wines, oils and fruits. Two handles were arranged on the neck. The common form of the amphora was pointed at the foot, which was placed in the sand. The later forms show a ring or base in which it stands. Figs. 3965, 3966. There is, however, a great variety of forms. The amphora highly prized for its beauty is the kind called the Panathenaic amphora, given as prizes at the Greek games. Figs. 3960, 3961, 3963. The amphora were sometimes used as cinerary urns and sometimes as coffins, being opened lengthwise to receive the corpse. Among Greeks

and Romans the amphora was used as a standard measure of capacity. The Attic amphora contained nearly nine gallons; the Roman about six.

Pelice. A wine jar distinguished from the amphora by narrowing upwards towards the mouth.

Stamnos. A jar used for mixing wines for the table by the ancients. It has been happily described as "a high-shouldered, short-necked, plethoric vase."

Hydria. A water-jar used for culinary purposes or drinking. It was of large capacity, seldom moved, and was filled from small vessels which could be carried to the spring. It usually had three handles and was decorated with a painting of some scene. Fig. 3967.

A large vase similar to the hydria, but having two handles, was used at elections for the reception of the votes. Similar vases were also used for storing the ashes of the deceased. Cinerary vases were sometimes without handles. Fig. 3964.

Krater. The krater was a gigantic punch-bowl from which the mixed wines were dipped out at feasts in the oenochoe, or wine-pitcher, and poured into the various forms of cups held by the guests. It had a wide neck and two handles. Figs. 3968, 3971.

Calpis. A water jar having three handles, two at the shoulders and one at the neck.

Celebe. A vase found chiefly in Etruria, distinguished by its peculiarly shaped handles, which are pillared.

Oxybaphon. A bell-shaped vase found in Magna Grecia.

Oenochoe. A wine-jug, dipper, wine-pitcher, or wine-pourer. Its lip was sometimes trefoiled. The jug in which the wine was transferred from the krater to the goblets of the guests. Fig. 3974.

Prochous. A smaller variety of oenochoe. An ordinary jug or pitcher. Fig. 3975.

Cantharus. A kind of drinking cup with handles. Fig. 3978.

Cythus. A single-handled drinking cup, generally used as a tumbler. It is distinguished from the larger vessel, the krater, for the drinking of it.

Carchesium. An antique drinking vessel with a shallow foot. It is wider than deep, smaller towards the center, and has handles rising high over the edge.

Phiale, Patera. A shallow, circular, saucer-like vessel, commonly of red earthenware, sometimes of bronze and other metals, ornamented with a drawn pattern. A bowl. The patera was used for holding liquids, and especially employed to contain the wine with which a libation was poured over the head of a victim, or on the altar. Occasionally it had handles.

Holcion. An antique drinking cup, resembling a small cantharus, but without handles, and much like our modern goblet.

Scyphus. A capacious drinking cup, used by the lower orders of the ancient Etrurians and Greeks.

Kylix (Calyx). The most common form of cup, broad and shallow, six to ten inches in diameter. The kylices have frequently paintings of wonderful delicacy and beauty. Fig. 3970.

Lepaste. A drinking cup, differing from the kylix in having a broad base to rest on, in place of the more elegant stem of that cup. Fig. 3969.

Rhyton. A drinking cup—sometimes in the form of a horn, or its foot extending into the head of a deer or some other animal.

Lebes. A deep vessel used to catch the water poured over the hands and feet at meal times.

Lecythus. A small elongated vase with a single handle, or without one, having a slender neck, to allow oils and perfumes to drop slowly from it. The "white"

lecythus was so called from the color of ground laid for the picture on it. It was peculiar to Attica, and was used as a funeral vase. Some of these are among the most delicate and beautiful works of Greek art. Figs. 3972, 3976.

Alabastron. A box, vase, or other vessel, to hold perfumes, formed of alabaster, and sometimes of gold.

Bombylios. A small, narrow-necked pot for perfumes.

Aryballos. A vase for ointments or perfumes used by the nations of antiquity. Fig. 3980.

Cotyliscos. A small pot with a single handle; in other respects like an amphora in miniature.



Fig. 5. Shows the modern potter's wheel turned by foot power.



Wood Carving.

BY CHAS. F. ZIMMERMANN.

THE art of wood-carving was practiced in the earliest times by the Greek and Roman sculptors, by the natives of India and Persia, by the Saracens, Moors, and the more civilized nations of Asia. In India the ancient Hindu temples were decorated with doors, ceilings and other fittings, carved in sandal and other woods. The patterns are rich and minutely elaborated. The Moslem wood-carvers designed and executed the richest panelling and other decorations for wall-lining, ceilings, pulpits and all kinds of fittings and furniture. In China and Japan the wood-carvers possess great technical skill. The extensive use of wood or bamboo for architectural purposes has always given the wood-carver a wide field for the exercise of his talent. A large number of small examples of Egyptian wood-carving exist in various museums, such as furniture, boxes, toilet articles, decorated with reliefs of animals and plants, the lotus and papyrus flowers skilfully treated predominating. The earliest examples of the plastic art among the Greek were the rude wooden images of the gods. The Palladium was one of these wooden images.

After the establishment of Christianity, sculpture in wood was employed in the Christian houses of worship. In Germany the art seems to have been especially encouraged, for not only the churches, but palatial edifices, the chateaux of the nobility, show beautiful examples of the art. In Augsburg, Aschaffenberg, Berlin, Cologne, Constance, Dresden, Gotha, Munich, Mannheim, Nuremberg, Ulm, Ratisbon, and other towns some of the most remarkable examples are found. In Holland and Belgium beautiful examples exist. Almost every church in Antwerp, Ghent, Brussels, Ypres, and other cities of Belgium abound with wood-carving. The town-halls and council chambers were also elaborately decorated in the same way. In England ornamental sculpture is applied to religious and domestic structures: and many of the old towns, such as Coventry, Chester, Shrewsbury, Ludlow, Hereford, still show fine specimens. Many of the buildings in England were decorated by Flemish artisans, particularly in Norfolk and Suffolk. The most illustrious of the English wood-carvers was Grinling Gibbons, who descended from a Dutch family. In Italy during the first half of the 16th century, wood-carving of the most elaborate and magnificent sort was largely used to decorate church stalls, wall-panelling, doors and the like. Many of the French cathedral and

abbey choir stalls of the mediæval period are of the utmost magnificence. Towards the close of the 15th century, the wood-carving of Germany occupied the foremost position in the world, and in many places, such as Nuremberg and parts of Bavaria, great technical skill has survived down to the present time.

2. THE PEOPLE MUST ENGAGE IN SOME ARTISTIC WORK.

Grant Allen in the *Magazine of Art*, writes: "In order to arouse artistic feeling in the people at large, they must all make something with their own hands. They must learn what handicraft means. That is just what very few of our people know as yet. If they could do something toward the decoration of their own homes, it would teach them a thousand times more than any number of art exhibitions or South Kensington Museums. They go to such places now and then in a blind sort of way, and they see the pictures, and the Venetian glass, and the Palissy ware, and the Oriental carving: but they don't know what these things mean, or how to admire them, because they have no standard of reference. They have done nothing with their own hands, so as to show them what handicraft is, and what qualities in it are admirable. . . .

"Give a man a piece of wood and ask him to carve it, say into a book-cover. If he has never learnt wood-carving he will at first know very little about it. But as he proceeds he will pick up principles from day to day, which will be a thousand times better impressed upon his mind than if he were merely told them by book or word of mouth, because he will have found them out for himself. He may spoil two or three book-covers in the process, but they will be well worth the trouble of spoiling. . . .

"Wherever art has been really a living thing among the people, it has been because the masses were engaged in artistic handicrafts. In Italy almost all the trades of the country involve more or less of art: in France a large proportion do so. Florentine mosaics, Venetian glass, Genoese filigree, Sevres porcelain, Gobelin's tapestry—all these things, whatever their various values in other ways, have gone to build up the national taste of France and Italy for good or for bad. And as you will always find that, where the general level is high, exceptional cases will rise still higher, so, as you do more to raise the taste of the mass, you will make possible more and more exceptional

[illegible]

3 THE SKILLED ARTISANS OF JAPAN.

Theodore Wores, in a recent number of the *Critic Magazine*, gives the American people some of his observations on the Japanese artists and artisans. The whole article should be carefully read and studied by all interested in general art education.

"In associating with the people and visiting the workshops, I was surprised at the almost universal ability displayed for drawing in a free, off-hand manner. Almost every artisan could, with the greatest facility, make a quick, effective sketch for any design that might be suggested to him. This facility in rendering forms and designs in flowing lines with brush and ink is undoubtedly owing to the graceful form of their writing, to which years of study are devoted; and this is in itself an art education.

He relates his experience with one of their wood carvers as follows:

"When I told him what I wanted he hastened to assure me that he could execute my order without the slightest difficulty, and displayed such eagerness to undertake the work that I resolved to give him a trial. The design of this frame, I explained to him, was to consist of lotus leaves, flowers and turtles, carved in relief. With the assistance of a few rough suggestions with a pencil I made my idea clear to him, and he volunteered to make a drawing. The next morning he presented himself with a large and elaborate sketch.

I could hardly believe it possible that such a beautiful work, which embodied in the most artistic manner all I had suggested, could have been executed in so short a time. His ability was therefore no longer to be questioned, and when a few days later I again called at his shop he was already hard at work on the frame. It was most fascinating to observe its progress. A rough piece of camphor wood, which represented one side of the frame, lay before him. With a few rapid strokes of his brush he indicated the general design, and then without any further preparation, seized his hammer and chisel, and without hesitation boldly hewed it away. The wood, making the shape of me every direction. Before long the unmistakable form of lotus, lily, bamboo, plum, willow, turtle, and water lilies came forth, and the work was complete.

forms to adapt them to the materials used. He does not consider it necessary that the form he plans should be a perfect or accurate reproduction of the object he undertakes to represent, but he does endeavor to give its character, however he may vary the design in conforming to the character of his materials.

"In this he is undoubtedly guided more or less by his artistic instinct, which is but an inheritance from generations of artisan forefathers, who have bequeathed to him their accumulated knowledge. Thus it is that the Japanese artisan is instinctively artistic, and produces artistic work almost unconsciously by simply following out his natural tastes and inclinations."

1. ITS USE IN ARCHITECTURE.

The Artist, London, gives an abstract of Mr. Pollen's lecture on wood carving. We can quote in part only.

"Now let us consider what the opportunities of the carver are, and what different methods of treatment he has at his command. There are the beams of which parts of all houses are constructed, and which, being of wood, are to be carved when the style of the architecture exposes them to view, as in church and hall roofs, rooms in which the joints of the floor above are exposed, etc. As beams and timbers are concentrations of strength, they often have to bear walls that exceed their thickness and project beyond their edges, such as door lintels, architraves, and the like. In these cases it is the angular edge, or so much of the edge as will not impair the strength of joists or rafters that can be carved effectively. In the case of a post such as a stair newel, the king post of a Gothic roof, both edges and sides can be carved—extra length of wood being allowed for the purpose above the stair newels or below the king posts—without interfering with the actual purpose of these posts, either in reality or apparently, apparent strength being necessary to due effectiveness. As to running mouldings worked on edges, whether of beams, joists, rafters or rails of any kind; or again, on the angles of door and window jambs and lintels, or on the framework of panels, the distinct rolls and hollows of which they consist must be limited in number. There should never be less than three, that a due proportion between the members may be maintained, nor should they be too numerous. Brackets have so many distinct ends projecting over the other. Cornices are made up of rows of brackets, or are one continuous running bracket. In this way cornices represent thicknesses of wood projecting from the wall one above another, and should represent, say, an upper, a middle, and a lower projection. We ought to preserve this idea in complicated cornices and give emphasis to the middle feature; then there will be a group of lines above it and a group of lines below. These groups break the angle between roof and wall, or anything

that represents roof, such as the top of a chimney-piece, or a door-way, and so forth. When you see an unmeaning succession of repeated mouldings, as you often do in builders' decoration, you will feel that the real idea of their relation to each other has never been grasped. If from solid timbers we pass to wall surfaces, it is obvious that large wall spaces can be only covered by framed paneling. The framework must be of sufficient thickness to be grooved to take the panels, and this extra thickness has to be relieved from the heavy appearance of a more thick edge. We have to ease down the edge by mouldings or lines in relief, some bolder, others finer, as the edges of the frame decrease till they meet the panel. In a large room cut up into paneling, the general effect will depend on the size and proportions of the panels to height and width of the room and of the rows of panels to each other. Paneling requires to have some rows taller than others, and to have upper and lower rows of less height than the general order. Upon the size of the panels will depend the boldness and size of the mouldings. We meet with large paneling in which the mouldings are planted into the junction of frame and panel, and exceed the thickness of both. I do not think it a good feature, and it is often a vulgarism.

5. CARVED MOULDINGS.

"In carving mouldings there are two rules to observe—one that the general form and outline of the original lines, or bars, or hollows moulded by the plane have to be preserved; another rule is that no work put upon these features ought to be allowed to quarrel with the direction of their lines. Foliage or plaited ornaments should run at right angles with that direction, and be delicate enough to lose themselves at a distance, at which the original moulding only can be distinguished. But in all large surfaces of panelling the greater quantity of moulding will be worked mechanically by a plane iron filed to the curvature required. If you examine the small panelling of the 15th century, much of it will be found to have been executed by a tool worked by the fingers after the wood has been framed together. The mouldings die down without meeting in the angles, but these mouldings are necessarily small and shallow. On furniture, chests, and other more important joinery, mouldings seem to have been cut throughout with the carver's gouge. Here, then, we have the treatment of edges of panels. How effective they can be made I need not say. Panels are sometimes made of wood, so thick as to be brought up to the level of the rails that frame them, and reduced by wide bevelings to meet the grooves of stiles and rails. The thick parts are left with a defined edge as though a thin extra plank were added to the thickness. I consider that the proper purpose of this thickness is to allow of carving. Carving in

these parts has to be in very low relief—historical subjects or leaf-work compositions. Figure carving in some places is sometimes of extraordinary merit. Examples can be seen among the cabinets of the Soulages collection in the Kensington Museum. There are, of course, parts or features of all interiors in which the carver has to put forth all his powers, those in which bold relief can be employed—door heads, fire places, and other prominent features. Here will come figure work, bold foliage, heraldry and the like. Generally and broadly speaking, what is it that makes carving effective? Not extreme skill in cutting, nor absolute indications of nature, however good. It is a knowledge of, or rather, an habitual recognition of, laws that govern all composed design which becomes what we know by the word feeling. We have spoken of mouldings on the edges of woodwork, and of composition of foliage and figures, heraldry, and other ornamental composition. What is the law that governs the due prominence and arrangement of lines and masses? I consider mouldings as bars or borders of light, separated just so much from the surface to which they form an edge as to show their outline. This first edging is the largest and widest, as it is on the thick portion of the wood; on its shaded side it dies gradually until it ends in a smaller roll, and then, perhaps, a sharp arris.

6. SOME PRINCIPLES TO BE OBSERVED IN WOOD CARVING.

"If you watch the growth and decay of styles of architecture, it is in the multiplication or breaking up or loss of meaning of mouldings that these stages of decay and corruption are most obvious. Mouldings form three-fourths of the carver's work. Carry this principle further into the composition of carved groups, such as fill sunk panels or pediments. One may be able to carve the figure of a man, a lion, or a piece of foliage, but so to combine a number of figures as to make each of them evident, to give the grace or the force that belongs to each of them respectively, and when combined to form an agreeable and well-balanced composition of masses and line of light, here is the difficulty. Regarding the amount of detachment or absolute relief that good carving in such cases ought to have, it will depend on the character of lightness and of movement the carver wishes to give his work. Generally, carving of this kind should never lose touch in appearance from the mass to which it belongs, and should die gradually into the shadow. Much excellent carved work loses value from too much under cutting, even in the work of so great an artist as Grinling Gibbons. Further, if carving is not to appear as if it floated in a disproportioned sea of shadow, neither should it be so crowded up as to become indistinct. Nor can decorative carving be carried, except to a limited degree, to the direct imitation of nature. As nature would not join animal and vegetable life together, so we are to

appears at first, and the purpose of objects, just as if we were making definite pictures of them, but such features of their nature as will gracefully express the arrangements of light and lines, as are required for our imitative purpose, and no further. The value of light and its concentration on masses of relief is of the first consequence to the carver; grace of line is second. Not that the two are separable, but the composition of masses seems to me the more difficult of the two."

7. HOUSEHOLD ART.

"In reviewing what may be called the household art of many ages, it would be difficult to assign an absolute superiority to the artists of any one generation, considering what countless beautiful objects have been made for the personal use and enjoyment of men. The sculptured thrones of ivory and gold, the seats and couches of bronze overlaid with gold and damascened with the precious metals, the inlaid chariots, tables, chests, and jewelled caskets of antiquity; the imagery, the shrines, the stalls, and roofs of the middle ages; the wood sculpture, tarsia, pietra dura, damascening and the endless variety of objects produced during the days of Leonardo, Michel Angelo, and Raphael, down to the carving of Gibbons, and the splendid work of Boulle, Riesener and Gouthière, are all in various ways excellent.

"We must not venture to call one class of production finer than another where the differences are so great and such high perfection has been attained in each. Every style and fashion when at its best has resulted from the utmost application of mind and time on the part of trained artists; and the highest art can never be cheap, neither can any machinery or any help from mechanical assistance become substitutes for art. Beauty which is created by the hand of man is not the clever application of mechanical forces or of scientific inventions, but is brought to light whether it be a cabinet front or the Venus of Milo, often with pain, always by the entire devotion of the labour, the intellect, the experience, the imagination and the affection, of the artist and the workman."—*John Ruskin, The Stones of Venice*.

8. SOME PRINCIPLES OF CONSTRUCTION AND ORNAMENTATION.

The constructive forms, moreover, should not be obscured by the ornament, but rather brought out by it; non-essential portions be equally decorated, but only such parts—traces, pilasters, capitals, pillars, or panels, when simple to the effect, are necessary. Over-enrichment, indeed, is to be avoided, and it would not be difficult to point out works of the merest pretensions and the most tasteless workmanship, which are completely spoiled by this fault. Carved furniture decorated with carving, the very

styles and rails being as decorated as the panels and pilasters; metal chandeliers, with leaves and flowers in as great profusion as in nature; papier-maché hidden under a surface of pearl and gold. It should be remembered that contrast is one of the first elements of pleasure, and that *repose* is one of the most valued excellencies of art; thus simplicity serves as the back ground to ornament, as the setting to the gem, or the foil that enhances the beauty of the jewel; and the good artist is as much shown in the economy of his labor as the bad one is by over-enrichment.

"In following out our principle that ornament should arise out of construction, the work, abstractedly, should be constructed and then decorated; not that it is meant that the ornament should be *applied* to the object, but (as in wood for instance) carved from it; thus the leg formed for support, the pilaster or column for bearing, may be lightened and enriched by cutting away from the block or slab, not by adding to it. In his natural state man is a true workman in this respect, and works on just principles without knowing it. The New Zealander, or South-Sea Islander first *forges* his war-club or his paddle of the shape best adapted for use, and then carves the surface to ornament it. The Swiss peasant, or the shepherd of our own hills, works in a similar way. Such also is the case in the works of Eastern nations, as is particularly exemplified in their choice sandal-wood carvings. Here the natural and the refined taste agree, for the best ornamental wood carving of the Renaissance is on this principle, low in relief, seldom projecting beyond the surface of the pilaster, or the framing of the panel.

"In wood-carving care should be taken not only to have the relief so managed as to guard the work as much as possible from accidental injury, but the designer should seek to adapt the forms of the ornament to the direction of the grain when it is open or free, and the work should be framed with a view to this consideration; moreover, ornamental carving should not be applied to wood of strongly-marked parti-coloured grain, but that which is homogeneous in color should be selected for the purpose, in order that the ornamental forms may as little as possible be interfered with by being mixed up with the lines and colours of the grain. It is curious how much costly and skilful labor has been thrown away from inattention to such minor considerations as these.

9. IMITATIVE CARVING IN FURNITURE NEVER JUST IS PRINCIPLE.

"The furniture of a man's house should indeed be well designed, well constructed, and judiciously ornamented, for, as it is constantly under his hand and eye, defects overlooked at first, or disregarded for some showy excellence, grow into great grievances, when, after they have become an offense, the

annoyance daily increases. Here at least utility should be the first object, and, as simplicity rarely offends, that ornament, which is the most simple in style, will be likely to give the most lasting satisfaction.

Yet how seldom is this consideration duly attended to! The ornament too often consists largely of *imitative* carving; bunches of fruit, flowers, game, and utensils of various kinds in swags and festoons of the most massive size and the boldest impost, attached indiscriminately and without meaning to bedsteads, sideboards, book-cases, pier-glasses, etc., rarely carved from the members of the work itself, but merely applied as so much putty-work or papier-maché might be. The laws of ornament are as completely set at defiance as those of use and convenience. Many of these works, instead of being useful, would require a rail to keep off the household. We see a sideboard, for instance, with garlands of imitative flowers projecting so far from the slab as to require a 'long arm' to reach across them, and ever liable to be chipped and broken; and cabinets and book-cases so bristling with walnut-wood flowers and oaken leaves, as to put use out of the question. . . .

"Those designers who unreservedly adopt the ornament of past times must, of course, apply it to their works without any peculiar significance or connected idea, but merely for its beautiful forms, elegance, grace, or richness. Where, however, any significant allusion, sentiment, or happy idea can be embodied in the ornament, uniting it with the use and intent of the work on which it is to be placed, it will have a charm which is otherwise wanting. Not that this want is peculiar to the application of traditional ornament, since the designer in the natural or imitative manner seldom attempts any connection between his decoration and the work to which it is to be applied. There seems no fitness, for instance, in surrounding the frame of a pier-glass with dead birds, game, shell-fish, nets, etc., although they may be excellent specimens of carving; nor is it clear why eagles should support a sideboard, or dogs form the arms of an elbow-chair; nor, again, why swans should make their nests under a table, at the risk of having their necks broken by every one seated at it. Indeed, in most cases, as such imitative forms cannot in the strict sense be called ornament, they almost challenge inquiry as to why they have been adopted, and only disappoint us when we find that their application has been without motive: this is not the case with traditional ornament, which, like the current coin, is accepted at once without inquiry. . . .

10. OUR ART-WORKMEN MUST STUDY DESIGN.

"The great defect in all our ambitious furniture is the want of art power in the workman. In this respect we are still sadly behind continental nations. Whenever the human figure is used as ornament in English works it is

pretty sure to be faulty. The figure may be well composed, may be evidently designed in good taste, since that is often the work of a superior artist: but in the execution it is almost always misunderstood and spoiled. The extremities are finished without knowledge of the internal structure, the fingers, toes, and joints have no bones within the skin, but that 'gummy' undecided treatment which evidences the ignorance of the workman. In wood-carving this is equally apparent, even when it consists only of ornamental forms. Very often in such work the 'design' of the ornament would seem to be by the same unskilled hand that carved it, since it is mostly out of place coarse, and merely 'natural' in style, and rarely reaches beyond the expression of the most commonplace thought, or the imitation of the commonest fruits and flowers. Success in rendering either the human figure or animals, when in life and motion, can only be the result of knowledge attained by a careful study of the structure of the bony frame-work and of the moving muscles; and thus it is the want of such anatomical knowledge and of a proper training in art that causes the deficiency we are obliged to notice in our furniture, and which compels the carver to confine himself to mere works of imitation, knowing that higher flights are beyond his powers. This deficiency of power and skill in the human figure is only an additional evidence of the want of better education for our art-workmen. They need to have proper treatises prepared for them, laying down the principles of ornament, and giving them a thorough foundation in practical geometry, form, proportion, and, above all, in anatomy, together with a careful education of the hand and eye. Unless the manufacturers of this country are soon awakened to our deficiencies, and prepared to make great sacrifices to support the government art schools, and to enable and induce their workmen to study in them, we must be content to lag still further behind as the world advances, and for the future to be manufacturers of cheap goods, leaving excellence and beauty to our continental neighbors."—*Richard Redgrave, R. A.*

11. MATERIALS AND TOOLS.

The wood of the lime-tree is well adapted for the first work of the beginner. When some knowledge has been gained of the manner in which tools should be used, the harder woods may be employed. Sycamore, holly and chestnut are light woods, pear is moderately hard but works well and takes a stain and polish readily. Apple, poplar, mahogany, bay-wood and cherry are also good woods. For small, delicate work box-wood and ebony may be used. Woods which show an ornamental grain, such as bird's-eye maple, or satin-wood, are used very little as the figure in the wood mars the effect of the carving. Oak is most generally used and next to it the

wood. In Europe, in addition to these two woods, the *sycamore*, the *chestnut*, the *fir*, and the *plane-tree* are chiefly used. In the oriental countries, cedar-wood and sandal-wood have been favorites with the carver. It is of great importance that the wood used should be thoroughly seasoned. "Green" wood causes great injury to the finished work.

Only a few tools are necessary for the beginner; more can be added as the use for them is determined. Get tools of the best make. A few square chisels, flat gouges, hollow gouges, skew chisels, a parting tool, or V tool, a macaroni tool, a mallet, a *pouch*, a small circular grind-stone of emery, an oil-stone, are all that are necessary to begin with. The chisels recommended are $\frac{1}{4}$ in., $\frac{1}{2}$ in., and $\frac{3}{4}$ in. flat tools: $\frac{1}{4}$ in. and $\frac{1}{2}$ in. gouges, straight and bent. (See pages 84 and 85.) The handles to the tools should be short, say five inches. Longer handles may be used later in the work.

It is important to keep the tools well sharpened. This requires considerable practice, as carver's tools are sharpened on both sides. The gouges must be carefully turned round during the process of sharpening, so as to grind evenly all parts of the edge. The macaroni tool is sharpened on the outside only. If tools are very blunt they are ground first, then sharpened on the oil-stone, and finished on a piece of stout buff leather prepared with grease, flour emery, and crocus. The Arkansas stone is the best for sharpening the finer tools. The punches for marking the background can be purchased or made by filing the point of a large spike or nail into four or more points.

The Addis' tools are considered the best. They are made in various sizes and shapes, but belong to the groups of tools named above. Each student must select the particular variety of tools from the various lists best suited to his wants. (See pages 84 and 85.)

As considerable force is used in carving wood it is very important that the block upon which the carving is done should be firmly fixed to the bench. A bench vise is used for this purpose, but the *carver's screw* has many advantages. (Page 84.) This screw is passed through a hole in the bench and screwed into the block of wood sufficiently far to get a firm grip of it, but not far enough to interfere with the carving. The screw is held by a fly nut underneath. As the learner progresses in his work, the best contrivances for holding the wood will naturally suggest themselves.

1. THE DESIGN.

A simple, compact, and the compact design of a few lines and curves is preferable to the complicated and formal designs of the carver. The kernel of the design should be well defined, and the lines well adapted to the material.

Preference is always to be given to designs from some old work of the fifteenth and sixteenth century when wood-carving flourished in the different countries of Europe. Original designs by the amateur wood-carver are in order when considerable skill has already been acquired.

On light wood draw the design in outline with a lead-pencil. On dark wood paint the design with a fine camel's hair brush in Chinese white, and mark the portions to be carved out in a darker color. The tracing wheel may be used to mark the design on the wood; or the design may be pasted on to the wood and the carving done through it. But where the design is to be preserved we can transfer it by placing carbon paper between the design and the wood.

13. FIRST EFFORTS.

Having selected a piece of pine about an inch thick for your first effort, see that it is free from knots or shakes. It should be planed so that you can draw or mark upon it easily, and square at the edges. Clamp the wood down upon the bench, table, or plank firmly. Draw lines upon it and taking your chisel or gouge practice cutting out the wood between the lines, cutting with the grain of the

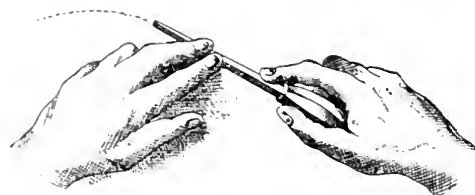


Fig. 1.

wood. Do not use the V tool to begin with as it is easily broken. Do not remove too much wood at first, but take away a little and go over it again. Practice cutting against the grain of the wood next. Then try to carve curves drawn upon the wood. Hold the tool in the right hand and guide it with the forefinger and middle finger of the left hand. (See Fig. 1.) Keep the fingers away from the edge of the tool. On no account hold the work with one hand while the tool is being used by the other. Bear on lightly, and remove the wood evenly. Sharpen the tool every ten or fifteen minutes on the hone or strap.

This preliminary practice will have given the student some idea of how to use the chisel and gouge, and he can now proceed with a simple pattern.

Select another piece of wood, planed and squared as suggested above. Cut away a narrow strip of wood a quarter of an inch wide and deep, making a rabbet or groove all around. Now in carving keep above the imaginary line A B, in Fig. 2, as this line is the ground level upon which the ornamentation will appear to lie when finished.

Draw or transfer the design upon the surface of the wood, in good, strong black lines. The parts forming the

background are now to be cut away until the ground line A B is reached. Outline the pattern with the chisel or gouge, pressing it down at an angle of 45° and away from the portion to be left in relief, never underneath it. Take out all the background, and get it quite even and flat. When all the ground has been taken away, trim up the edges of the raised parts.

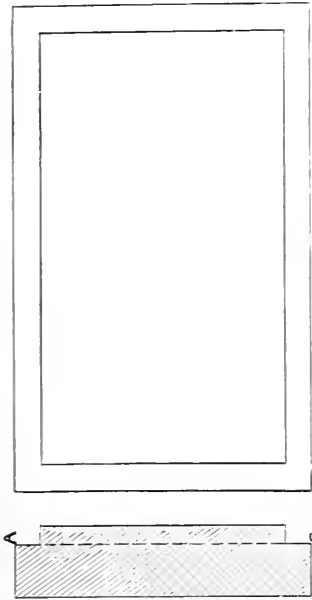


Fig. 2.

When the student has mastered this part of the work well, he has already laid a good foundation in the art. It is therefore best to confine all his early efforts to work of this nature. Prick or indent the background with the

punch or stamp; (see page 84); the closer and deeper these indentations are made, the better.

14. FINISHING.

But not all work is left in the state in which it was after the ground had been taken out. The student must decide which are to be the most prominent points in his work, and he must work from these so as to produce the proper distribution of the lights and shadows; he must give prominence to some forms so as to appear to come

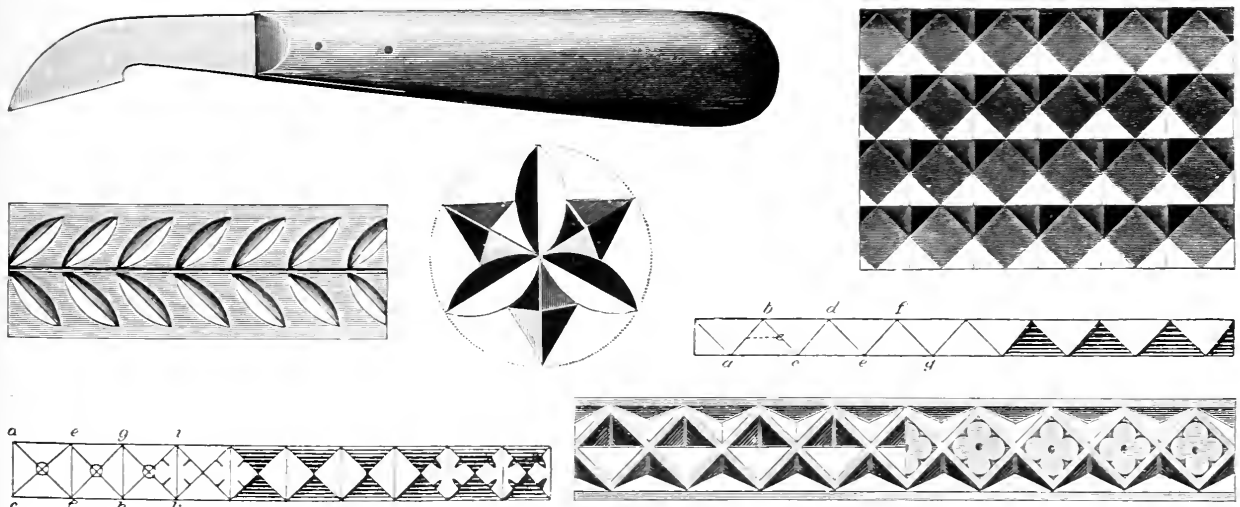
forward, and others to recede or pass into the background. This requires judgment and skill for which no definite rules can be laid down. Observation and study of nature are the only safe guides.

In giving his work the finishing touches, the student has a chance to display his artistic feeling and appreciation of the beauties of form. If his preparation in drawing and modeling, and the study of nature has been systematic and thorough his mind will have become critical, and he intuitively rejects whatever will mar his work, while he is at the same time able to select what is most worthy of being expressed.

The work having been completed it is not necessary to efface the tool marks by trying to obtain the smoothness produced by sandpaper and polishing. These very tool marks show the skill or the lack of skill of the carver. The piece of work may be oiled, stained, or polished with oil, but should never be made to appear anything else than the product of the sculptor in wood.

15. KERBSCHNITT.

This beautiful system of surface decoration, consisting of geometrical forms carved in wood, was much in vogue in all the northern countries of Europe as far back as the 13th century. As much of this work can be executed with the aid of the knife and a few tools, it has been adopted as one of the branches of manual training in the schools of Germany with excellent results. The surface to be ornamented is divided into regular spaces by using the rule and the compass. The background of these figures is not flat and even as in wood carving described above, but the whole surface is broken up in regular and irregular forms, the lights and shadows being so disposed as to produce a very beautiful effect. (See illustrations below).



Grecian Mythology.

BY CHAS. F. ZIMMERMANN.

TO Homer and Hesiod, as well as to the Greeks universally, Zeus is the great and predominant god, "the father of gods and men," whose power none of the other gods can hope to resist, or even deliberately think of questioning. All the other gods have their specific potency and peculiar sphere of action and duty, with which Zeus does not usually interfere; but it is he who maintains the lineaments of a providential superintendence, as well over phenomena of Olympus as over those of earth. Zeus and his brothers, Poseidon and Hades, have made a division of power; he has reserved the ether and the atmosphere to himself—Poseidon has obtained the sea—and Hades the underworld or infernal regions; while earth, and the events which pass upon earth, are common to all of them, together with free access to Olympus.

"The inmates of this divine world are conceived upon the model, but not upon the scale, of the human. They are actuated by the full play and variety of those appetites, sympathies, passions, and affections which divide the soul of man; invested with a far larger and indeterminate measure of power, and an exemption as well from death as (with some rare exceptions) from suffering and infirmity. The rich and diverse types thus conceived, full of energetic movement and contrast, each in his own province, and soaring confessedly above the limits of experience, were of all themes the most suitable for adventure and narrative, and operated with irresistible force upon the Grecian fancy. All nature was then conceived as moving and working through a number of personal agents, among whom the gods of Olympus were the most conspicuous; the reverential belief in Zeus and Apollo being only one branch of this omnipresent personifying faith. The attributes of all these agents had a tendency to expand themselves into illustrative legends—especially those of the gods, who were constantly invoked in the public worship. Out of the same mental source sprang both the divine and heroic myths, the former being often the more extravagant and abnormous in their incidents, in proportion, as the general type of the gods was more vast and awful than that of the heroes.

"As the gods have houses and wives like men, so the present dynasty of gods must have a past to repose upon; and the curious and imaginative Greek, whenever he does not find a recorded past ready to his hand, is uneasy until he has created one. Thus the Hesiodic theogony explains, with a certain degree of system and coherence, first, the antecedent circumstances under which Zeus acquired the divine empire, next the number of colleagues and descendants.

"The divine race, under the presidency of Zeus, will give us:

1. The twelve great gods and goddesses of Olympus—Zeus, Poseidon, Apollo, Ares, Hephaestus, Hermes, Here, Athene, Artemis, Aphroditë, Hestia, Demeter.

2. An indefinite number of other deities, not included among the Olympic, seemingly because the number *twelve* was complete without them, but some of them not inferior in power and dignity to many of the twelve. Hades, Helios, Hekate, Dionysos, Leto, Dione, Persephone, Selene, Themis, Eos, Harmonia, the Charities, the Muses, the Eileithyia, the Moerae, the Oceanids, and the Nereids, Proteus, Eidothea, the Nymphs, Lenkothea, Phorkys, Æolus, Nemesis, etc.

3. Deities who perform special services to the greater gods: Iris, Hebe, the Horæ, etc.

4. Deities whose personality is more faintly and unsteadily conceived: Ate, the Lite, Eris, Thanatos, Hypnos, Kratos, Bia, Ossa, etc. The same name is here employed sometimes to designate the person, sometimes the attribute or event not personified—an unconscious transition of ideas, which, when consciously performed, is called allegory.

5. Monsters, offspring of the gods: the Harpies, the Gorgons, the Grææ, Pegasus, Chrysaor, Echidna, Chimæra, the Dragon of the Hesperides, Cerberus, Orthros, Geryon, the Lernean Hydra, the Nemean Lion, Scylla and Charybdis, the Centaurs, the Sphinx, Xanthos and Balios the immortal horses, etc.

"Each god had many different surnames, temples, groves, and solemnities, with each of which was connected more or less of mythical narrative, originally hatched in the prolific and spontaneous fancy of a believing neighborhood, to be afterwards expanded, adorned, and diffused by the song of the poet."—(*Grob.*)

"The primitive chaotic conflicts appear under the form of the war of the Titans; their end is the confinement of those giants in Tartarus, whose compulsory subjection is the commencement of order: thus Atlas, the son of Iapetus, is made to sustain the vault of heaven in its western verge. The moral is prefigured by such myths as those of Prometheus and Epimetheus, the fore-thinker and the after-thinker; the historical in the deluge of Deucalion, the sieges of Thebes and of Troy. A harmony with human nature is established through the birth and marriage of the gods, and likewise by their sufferings, passions and labors. The supernatural is gratified by Centaurs, Gorgons, Harpies and Cyclops.

"There was a universal agreement that heaven was situated above the blue sky; but as to hell, much difference of opinion prevailed. There were many who thought that it was a deep abyss in the interior of the earth, to which certain passages, such as the Acherusian cave in Bithynia led. But those who with Anaximenes considered the earth to be like a broad leaf floating in the air, and who accepted the doctrine that hell was divided into a Tartarus, or region of night on the left and an Elysium, or region of dawn on the right, and that was equally distant from all parts of the upper surface, were nearer to the original conception, which, doubtless, placed it on the under or shadowy

side of the earth. Two parties of descent were tries in the west, where the sun and stars set, though here and there were passages leading through the ground to the other side, such as those by which Heracles and Ulysses had gone. The place of ascent was in the east, and the morning twilight a reflection from the Luvian fields.

"On the rim of the flat earth is the circumfluous ocean, the source of the rivers, which all flow to the Mediterranean. 'The sea-girt disk of the earth supports the vault of heaven.' Impelled by a celestial energy, the sun and stars, issuing forth from the east, ascend with difficulty the crystalline dome, but down its descent they more readily hasten to their setting. No one can tell what they encounter in the land of shadows beneath, nor what are the dangers of the way. In the morning the dawn mysteriously appears in the east, and swiftly spreads over the confines of the horizon; in the evening the twilight fades gradually away. Besides the celestial bodies, the clouds are continually moving over the sky, forever changing their colors and their shape. No one can tell whence the wind comes or whither it goes; perhaps it is the breath of that invisible divinity who launches the lightning, or of him who rests his bow against the cloud. Not without delight men contemplated the emerald plane, the sapphire dome, the border of silvery water, ever tranquil and ever flowing. Then in the interior of the solid earth, or perhaps on the other side of its plane—under world, as it was well termed—is the realm of Hades or Pluto, the region of night. From the midst of this dominion, that divinity, crowned with a diadem of ebony, and seated on a throne framed out of massive darkness, looks into the infinite abyss beyond, invisible himself to mortal eyes, but made known by the nocturnal thunder, which is his weapon. The under world is also the realm to which spirits retire after death. At its portals, beneath the setting sun, is stationed a numerous tribe of spectres—Care, Sorrow, Disease, Age, Want, Fear, Famine, War, Toil, Death and her half brother Sleep—Death, to whom it is useless for man to offer either prayers or sacrifice. In that land of forgetfulness and shadows there is the unnavigable lake Avernus, Acheron, Styx, the groaning Coeytus, and Phlegethon, with its waves of fire. There are all kinds of monsters and forms of fearful import: Cerberus, with his triple head; Charon, freighting his boat with the shades of the dead; the Fates, in their garments of ermine bordered with purple; the avenging Erinyes; Rhadamanthus, before whom every Asiatic must render his account; Eacus, before whom every European; and Minos, the dread arbiter of the judgment seat. There, too, are to be seen the great criminals whose history is a warning to us—the giants, with dragon's feet extended in the burning gulf for many a mile; Phlegyas, in perpetual terror at the stone suspended over him, which never falls; Ixion, chained to his wheel; the daughters of Danaos still vainly trying to fill their sails; Tantalus, immersed in water to his chin, yet tormented with unquenchable thirst; Sisyphus despairingly laboring at his ever descending stone. Warned by such examples, woe men learned to content the gods.

The wind raised Odysseus and the voyage of Jason and the Argonauts, and the ship that when they went to seek the golden fleece, the ship that kept the crew from the mysteries and secrets of the gods.

With a few exceptions the Roman names of the gods and goddesses are much less preferred to their Greek names. For the most part, the Romans have adopted the names of the gods as the Greeks gave them, and have added to them the epithets of the gods.

THE GODS OF OLYMPUS.

Greek.	Roman.	
Zeus.	Jupiter.	The ruler of heaven and earth.
Hephestus.	Vulcanus.	The god of fire and the forge.
Hera.	Juno.	Queen of heaven.
Pallas Athene.	Minerva.	Goddess of wisdom.
Phoebus Apollon.	Phoebus Apollo.	Presiding deity of various arts and protector of the muses.
Artemis.	Diana.	A virgin goddess who presides over hunting, chastity, and marriage.
Ares.	Mars.	The god of war.
Aphrodite.	Venus.	Goddess of beauty and love.
Hermes.	Mercurius.	The ambassador of the gods.
Hestia.	Vesta.	The goddess of the family hearth.
Eros.	Amor—Cupido.	God of love.
Nike.	Victoria.	Winged attendant on the superior deities.
Hebe.	Juventas.	Cup-bearer of the gods.
Helios.	Sol.	The sun-god.
Selene.	Luna.	The moon.
Eos.	Aurora.	Goddess of the dawn.

Besides these there were the Muses, daughters of Zeus. They are named Polyhymnia, the muse of the grave chant of religious music; Calliope, the muse of epic poetry and science generally; Clio, the muse of history; Euterpe, the muse of lyric poetry; Melpomene, the muse of tragedy; Terpsichore, the muse of dancing; Erato, the muse of erotic poetry, together with geometry and the mimic art; Thalia, the muse of comedy; Urania, the muse of astronomy.

The Charities or Graces, generally appear in attendance upon the gods; their names are Aglaia, Euphrosyne and Thalia.

Themis and her three daughters, the Horæ (Seasons)—Eunomia, Dike and Irene, represent the regular march of nature in the changes of the seasons. The four chief winds were the sons of Eos. They are named Boreas, or Aquilo, the rude north wind; the Zephyrus, the welcome messenger of spring; Notus, the south wind; and Eurus, the east wind.

OTHER GODS.

(Greek.)	(Roman.)	
Poseidon.	Neptunus.	The mighty ruler of the sea.
Amphitrite.	Salacia.	The wife of Neptune.
Gæa.	Tellus.	Mother earth.
Rhea.	Cybele.	Mighty mother.
Dionysus.	Bacchus.	The god of wine.
Demeter.	Ceres.	Protectress of agriculture.
Persephone, Kora.	Proserpina.	Goddess of vegetation.
Hades.	Pluto.	The ruler of the lower world.
Hekate.		Rules over the secret forces of nature.
Asklepius.	Esculapius.	The god of the healing art.

Hygiea was the goddess of health. She was described as the daughter of Esculapius. Nemesis was regarded as the goddess of equality, and sees that happiness and misfortune are allotted to man according to merit. Tyche was the goddess of good fortune. Besides Fortuna, the Romans honored a deity called Fortitas, as the goddess of positive good fortune. The Tritons were sea-deities of fantastic form. Nereus,

the son of Pontus (the sea), represents the sea in a quiet state. Ino, afterward named Leucothea, was regarded as a benevolent sea-deity. The Sirens were also sea-deities, whose songs were death to those who were seduced by them. The Oceanids were the numerous descendants of Oceanus. The Nymphs were tender, graceful maidens, who preferred the peaceful solitude of the woods and mountains to the habitations of man. The Satyrs (Fauni) were sensual wood and mountain spirits following in the train of Dionysus. Silenus, an old satyr, tended and brought up Dionysus. Pan was a very ancient god of the woods and meadows. The Erinyes (Furies) executed the commands of Hades and Persephone.

THE HEROES.

In Homer's account of the **Centaurs**, they are not demons, but an old Thessalian mountain tribe of giant strength and savage ferocity, utterly unable to control their rude, sensual nature. They are celebrated in ancient story for their fight with the Lapithæ, which arose at the marriage feast of Pirithous. It ended by the Centaurs being expelled from their country, and taking refuge on Mount Pindus, on the frontiers of Epirus. Chiron is the most celebrated among the Centaurs. We know that hunting the bull on horseback was a national custom in Thessaly, and that the Thessalians were celebrated riders. Hence may have arisen the fable that the Centaurs (Bull-Killers) were half men and half horses, just as the American Indians when they first saw a Spaniard on horseback, believed horse and man to be one being. The Centaurs are frequently represented in ancient works of art, and generally as men from the head to the loins, while the remainder of the body is that of a horse, with its four feet and tail.

The celebrated legend of **Cadmus** relates the founding of Thebes. When Europa was carried off by Zeus (Jupiter) to Crete, Agenor sent Cadmus in search of his sister, enjoining him not to return without her. Unable to find her he settled in Thrace; but having consulted the oracle at Delphi, he was commanded by the god to follow a heifer of a certain kind, and to build a town on the spot where the heifer should lie down with fatigue. He found the heifer in Phœcis and followed her to Boœtia, where she sank down on the spot on which Cadmus build Cadmea, afterwards the citadel of Thebes. Intending to sacrifice the heifer to Athena (Minerva), he sent some persons to a neighboring well where they were slain by a dragon belonging to Ares (Mars), who guarded the spring. Thereupon Cadmus slew the dragon, and, on the advice of Athena, sowed the teeth of the monster, out of which armed men grew up, who killed each other, with the exception of five, who were the ancestors of the Thebans. Cadmus and his wife Harmonia were afterwards changed into serpents and removed by Zeus to Elysium. Cadmus is said to have introduced into Greece, from Phœnicia, or Egypt, an alphabet of sixteen letters.

The lamentable fate of **Actæon** has always been a favorite subject for sculpture. Actæon had been trained by Chiron as a hunter and warrior. When he had hardly reached the prime of his youth, being out hunting one day on Mount Cithæron, he was transformed by Artemis into a stag, and was torn in pieces by his own dogs. He had incurred the displeasure of the chaste goddess and was thus punished by her.

Another tragedy, the punishment of **Dirce**, is related. Antiope, the mother of Amphion and Zethus, having been taken prisoner by Lycus, was obliged to submit to the most harsh and humiliating treatment at the hands of his wife Dirce. At length

she managed to escape, and by a wonderful chance discovered her sons, who had grown into sturdy youths. The story of her wrongs so enraged them that they resolved to wreak vengeance on Dirce. After having taken Thebes and killed Lycus, they bound Dirce to the horns of a wild bull, which dragged her about until she perished. Her mangled remains they cast into a spring near Thebes, which was henceforth called the fountain of Dirce.

Amphion is further celebrated on account of the melancholy fate of his sons and daughters. He married **Niobe**, the daughter of Tantalus, king of Phrygia. Proud of the number of her children, she deemed herself superior to Leto (Latona), who had given birth to only two children. For this presumption her children were slain by Apollo and Diana, and she was changed into stone. Amphion slew himself. **Zethus** was also unfortunate in his domestic affairs. Aedon, his wife, jealous of the Niobe in having so many beautiful children, while she had an only son, Itylus, resolved one night to slay the eldest son of Niobe. But by mistake she killed her own child. Zeus took compassion on her, and changed her into a nightingale. In this guise she continues to bewail her loss in long-drawn mournful notes.

One of the national heroes of Corinth was **Bellerophon**. Being obliged to leave Corinth he was hospitably received by Proetus, king of Tiryns, whose wife falling in love with him, and finding her passion slighted, slandered him before her husband. Proetus sent Bellerophon at once to Iobates, king of Lycia, to have him put to death. Iobates sought to fulfill the command of Proetus by involving his guest in all kinds of desperate adventures. He sent him to destroy the Chimæra, a dangerous monster that devastated the land. Bellerophon destroyed the monster by raising himself in the air on his winged horse Pegasus, and shooting it with his arrows.

Iobates now sent Bellerophon to subdue a neighboring hostile mountain tribe, which he accomplished; and then against the warlike Amazons, a nation of women, trained from their earliest youth in all warlike exercises. Returning in triumph from this expedition, his life was attempted once more by being surprised by an ambuscade. Bellerophon, however, escaped, and slew all his assailants. Iobates now gave him his daughter in marriage and a share in his reign. Later in life Bellerophon was seized with madness, and wandered about alone, fleeing the society of man, until he at length perished miserably.

The story of **Perseus** is one of the Argive legends. Acrisius, the grandfather of Perseus, had him and his mother, Danaë, confined in a chest and cast into the sea, because the oracle had told him that he was doomed to perish by the hands of his grandson. The chest was cast by the waves on the rocky island of Seriphus, where it was found by a fisherman. Danaë and young Perseus were well cared for here. Subsequently Polydectes, the governor of the island, wished to marry Danaë, and on her rejecting him, made her his slave. When Perseus was grown up, Polydectes dispatched him to bring the head of the Gorgon Medusa. In this perilous adventure he was aided by Hermes and Athena. Perseus first went to the Græce, the sisters of the Gorgons, took from them their one tooth and their one eye, and would not restore them until they showed him the way to the Nymphs, who possessed the winged sandals, the magic wallet, and the helmet of Hades (Pluto), which rendered the wearer invisible. Having received from the Nymphs these invaluable presents, from Hermes a sickle, and from Athena a mirror, he mounted into the air, and arrived at the abode of the Gorgons, who dwelt near Tartessus, on the coast of the ocean. He found them asleep, and cut off the head of Medusa,

as Laomedon proved false to his word, Hercules on leaving threatened to make war against Troy, a threat which he afterwards carried into execution. The tenth labor of Hercules was the capture of the oxen of Geryones in Erythia. The oxen of Geryones, a monster with three bodies, were guarded by the giant Eurytion and the two-headed dog, Orthrus, and Hercules was commanded to fetch them. He undertook this long journey, meeting with numerous adventures on the way. To cross the sea, he forced Helios to lend him a golden boat, by shooting at him with his arrows. Having reached Erythia, identified as Gades, or the Balearic islands, he killed the herdsman who was keeping the oxen, together with his dog, and the monster Geryones. He sailed with his booty to Tartessus, where he returned the golden boat to Helios. On his homeward journey many attempts were made to deprive him of the oxen, but he brought them safely to Eurystheus, who sacrificed them to Hera. The eleventh labor of Hercules was to fetch the golden apples of the Hesperides. Hera had received them from Gaia at her wedding, and had entrusted them to the keeping of the Hesperides and the dragon Ladon, on Mount Atlas, in the country of the Hyperboreans. On arriving at Mount Atlas, Hercules sent Atlas to fetch the apples, and in the meantime bore the weight of heaven for him. Atlas returned with the apples, but refused to take the burden of the heavens on his shoulders again. Hercules, apparently agreeing, asked Atlas to relieve him until he had arranged more comfortably a cushion for his back. When Atlas consented, Hercules left him in his former position, and made off with the apples. The twelfth labor of Hercules was the bringing of Cerberus from the lower world. He descended into Hades, accompanied by Hermes and Athena. He delivered Theseus and Ascalaphus from their torments. Pluto granted him permission to take Cerberus to the upper world, provided it was done without the force of arms. Hercules seized the furious beast, and having chained him, he brought him to Eurystheus, and afterward carried it back again to the lower world. After Hercules had performed the twelve labors, he was released by Eurystheus and returned to Thebes.

Theseus is the national hero of the Ionians, just as Hercules is of the Æolians. There is no great undertaking of antiquity in which Theseus is not supposed to have taken part. He was brought up at Troezen, and at sixteen his mother took him to the stone where his father, Ægeus, had left his sword and sandals. Theseus, with a slight effort, raised the stone and took the tokens to Athens. On his way he destroyed the robbers and monsters that infested the country. Theseus next captured the Marathonian bull, which had long been the terror of the surrounding country. After this he went of his own accord as one of the seven youths whom the Athenians were obliged to send every year, with seven maidens, to Crete, in order to be devoured by the Minotaur. With the aid of a clew of thread which Ariadne, the daughter of Minos, gave him, he was able to find his way out of the labyrinth after he slew the Minotaur. Having effected his object he sailed away, carrying off Ariadne, whom he deserted at Naxos. As the vessel in which Theseus sailed approached Attica, he neglected to hoist the white sail, which was to have been the signal of the success of the expedition, whereupon Ægeus, believing that his son had perished, threw himself into the sea. One of the most celebrated of his adventures was his expedition against the Amazons. It is said that he made war upon them soon after Hercules had assailed them, and he carried off their queen, Antiope. The Amazons then invaded Attica, and the final battle in which

Theseus defeated them, was fought in the heart of the city of Athens. Theseus was one of the Argonauts; joined in the Calydonian hunt; aided Pirithous against the Centaurs, and with his assistance, carried off Helen from Sparta, and the two attempted to carry Persephone from the lower world. Pirithous perished in the enterprise, and Theseus was kept in hard durance until delivered by Hercules.

The story of **Meleager** and the Calydonian boar hunt is, no doubt, a provincial myth. Æneus, king of Calydon in Ætolia, on the occasion of a great festival, had either accidentally or purposely omitted to sacrifice to Artemis. To punish this neglect, she sent a huge wild boar, which proved very destructive to the country, and seemed invincible by ordinary means. Meleager, the brave son of Æneus, called together all the renowned heroes of Greece, and after entertaining them with great splendor for nine days, the hunt began, and the huge beast, which was larger than an ox, was surrounded and driven from his lair. Atalanta was the first to wound him, and the enraged beast tore open the body of one of the heroes who advanced with his battle-ax. At length Meleager hurled his spear and the monster received a mortal wound; it was soon dispatched by the rest of the heroes. Meleager received the head and hide of the slaughtered animal, but gave his reward to Atalanta, on the ground that she first wounded the boar. This excited the bitter jealousy of the brothers of Althæa, the mother of Meleager, and they laid in wait for Atalanta and robbed her of her present. Enraged at this, Meleager slew them both. Althæa in the first outburst of grief and indignation, placed a certain brand which she had carefully treasured up, again in the fire, and thus, according to the oracle, cut off the life of the noble hero in the prime of his youth.

The story of the **Argonauts** is the history of the heroes who sailed to Colchis for the recovery of the golden fleece. It is related that Ino, the daughter of Cadmus, persuaded her husband, Athamas, to sacrifice Phrixus, his son, as a sin-offering to Zeus, in order to put an end to the drouth with which the land was visited. Whether Helle, his sister, was to have shared his fate, is not stated; but before Ino, the stepmother, could accomplish her purpose, Nephele came to the assistance of her children, and gave them a winged ram with a golden fleece, which Hermes had presented to her for that purpose. Seated on this ram they fled over the sea to Colchis. On the way Helle fell into that part of the sea which bears her name and was drowned, but Phrixus arrived safely in Colchis, where he sacrificed the ram to Zeus, who had preserved him in his flight. The fleece he hung up in the grove of Ares as a sacred treasure, and was guarded day and night by a dragon.

When **Jason** had completed his twentieth year, he went to his uncle to demand of him his rightful inheritance. Pelias promised to restore the crown if he would get the golden fleece from Colchis. Jason undertook the enterprise, and commanded Argus, the son of Phrixus, to build a ship with fifty oars, which was called the *Argo*, after the name of the builder. Jason was accompanied by all the great heroes of the age, to the number of fifty. After meeting with many adventures, they at length arrived at Colchis. The King Æëtes promised to give up the golden fleece if Jason would yoke to a plow two fire-breathing oxen with brazen feet, and sow the teeth of the dragon which had not been used by Cadmus at Thebes. Medea, the daughter of Æëtes, fell in love with Jason, and, on his promising to marry her, she furnished him with the means of resisting fire and steel, and put to sleep the dragon that guarded the golden fleece.

Biographical and Mythological Notes,

EXPLANATORY OF ILLUSTRATIONS IN "ART STUDIES." EDITED BY C. F. ZIMMERMANN.

A**CHILLES**, Borghese, formerly in the Borghese collection, Rome, now in the Louvre, Paris, thought to be Achilles by the ring above the right ankle, supposed to have been placed there to protect the heel, the only vulnerable part of Achilles. For further description, see Grecian Mythology.

Adonis, Vatican, Rome.—As a child his beauty attracted the love of Venus and of Proserpine. They quarrelled about the possession of him and Jupiter decided the matter by allowing Adonis to spend eight months of the year with Venus and four months with Proserpine. Adonis was killed by a boar while hunting and Venus changed his blood to flowers.

Æschylus was the father of Greek tragedy and over seventy tragedies of his time are ascribed to him.

Æsculapius is the god of the healing art. The centaur, Chiron, instructed him, and the disciple soon excelled his master. He not only kept his patients from dying, but was able to restore the dead to life. In 292 B. C. a fatal pestilence prevailed in Rome. The gods commanded that Æsculapius be brought from Epidaurus. When the embassy arrived there and had made their request, a snake crept out of the temple and into the ship. This snake was regarded as Æsculapius. Returning with it to Rome the pestilence vanished.

Agassiz, Louis Jean Bodolph, one of the most distinguished of modern naturalists, was born in Switzerland in 1807, and died in Massachusetts in 1873. Agassiz was educated at Heidelberg and Munich; comparative anatomy being his favorite study. He filled the chair of Natural History in Neuchâtel. He came to the United States in 1846, and was successively appointed at Harvard University, at Charleston, S. C., and at Cornell University, N. Y. He declined the offer of a chair in Paris made him by the Emperor of France. He wrote numerous works on Zoology.

Agrippa, M. Vipsanius, a great Roman general, born B. C. 63, and died A. D. 12. In the civil wars which followed the death of Caesar, and which gave Augustus the sovereignty of the Roman world, Agrippa took an active part, and his military abilities contributed greatly to that result. He was thrice consul, and in his third consulship, he built the Pantheon. He continued to be employed in various military commands till his death.

Ajax, son of the king of Salamis. He sailed against Troy in twelve ships, and is represented in the Iliad as second only to Achilles in bravery. In the contest for the armour of Achilles he was conquered by Ulysses, and this, says Homer, was the cause of his death.

Ajax and Achilles, also known as Menelaus and Patroclus; original group in the Loggia dei Lanzi at Florence.

Amazon, original in the Vatican, Rome. The Amazons were a nation of women trained from their earliest youth in all war-like exercises.—See Grecian Mythology under *Theseus*, and *Achilles*.

Amor, Eros, Cupid.—The god of love. He was represented as a wanton boy, of whom a thousand tricks and cruel sports were related, and from whom neither gods nor men were safe.

His arms consists of arrows, quiver and of torches, which no man can touch with impunity. He is further represented with golden wings, and as fluttering about like a bird. His eyes are sometimes covered, so that he acts blindly. He is the usual companion to his mother, Aphrodite.

Amor Greco, Vatican (Genius of the Vatican).

Amor and Psyche. Psyche, as the personification of the human soul. She excited by her beauty the jealousy and envy of Venus. To avenge herself the goddess ordered Cupid, or Amor to inspire Psyche with a love for the most contemptible of all men; but Cupid was so stricken with her beauty that he himself fell in love with her. Having undeservedly caused the mistrust of Cupid, he deserted her and she wandered from temple to temple in search of him. Falling into the hands of Venus again her real sufferings began, for the hardest and most humiliating labors were imposed upon her and she would have perished under the weight of her suffering had not Cupid, who still loved her in secret, invisibly comforted and assisted her in her toils.

Angelo Buonarroti, Michel, was born in 1474, and died in 1563. He stood unrivalled as a painter, sculptor and architect. His earliest original works were a Kneeling Angel, The Statues of Bacchus and David at Florence, and a magnificent group representing the Mater Dolorosa, which was placed in St. Peter's at Rome. His works were all on a colossal scale and showed marvelous knowledge of the anatomical development of the human figure, and extraordinary powers of execution. His cartoons in the Sistine Chapel are marvels of beauty and perfection. He devoted much time to remodeling St. Peter's, in Rome, which by the touch of his genius, was converted from a mere Saracenic hall, into the most superb model of a Christian church.

Antinous, a youth of extraordinary beauty, was the favorite of the Emperor Hadrian and his companion in all his journeys. He was drowned in the Nile. The grief of the Emperor knew no bounds. He enrolled Antinous among the gods, caused a temple to be erected to him, at Mantinea, and founded the city of Antinoopolis in honor of him.

Antony, Mark, one of the most distinguished orators of his age. Born 83 B. C., he laid the foundation for extravagant living in his youth, early espoused the cause of Julius Caesar, and in B. C. 44 was appointed his colleague in the government. Upon Caesar's death he delivered the funeral oration and incited the people to drive the conspirators from Rome. At first opposing Octavianus, who had succeeded Caesar, he finally effected a reconciliation with Octavianus, and with him and Lepidus founded the triumvirate. In his foreign wars he met Cleopatra, queen of Egypt, and from that moment became the complete slave of her caprices. Having been defeated by Octavianus he stabbed himself and died in the presence of Cleopatra.

Apollino, the little Apollo, is the beautiful and well-known figure in the Tribune of Florence, appropriately named Apollino, for it is the idle, careless, dreaming god, the offspring of poetic fancy rather than genuine faith.

Apollo, one of the great divinities of the Greeks. The powers ascribed to him are apparently of different kinds; he was

the 20000 possessor of the god is represented with bow and arrows; the 20000 who callous to point towards all evil; the god of propitiation; the god of song and lions; the god who protects the flocks and cattle; the god who delights in the foundation of cities and towns and the establishment of civil constitutions; and the god of the sun.

Apollo Belvedere. Marble in the Vatican. The original of this colossal statue was discovered in the 16th Century and placed by Michael Angelo in the Belvedere Gallery, Rome. The name of the sculptor is not known.

Apollo Sauroktonos, the Lizard-killer, is represented as a youth amusing himself by striking at a lizard on the tree beside him.

Apoxymenos, original in the Vatican. It was the custom of Greek athletes to rub their body with oil before exercising. This statue represents a Greek youth scraping the oil and the dust of the arena from his body with an instrument called strigil.

Ariadne, daughter of Minos and Pasiphae, fell in love with Theseus, when he was sent by his father to convey the tribute of the Athenians to the Minotaur, and gave him the clew of thread by means of which he found his way out of the labyrinth. Theseus, in return, promised to marry her, and she, accordingly, left Crete with him, but on their arrival in the island of Dia (Naxos), she was killed by Artemis (Diana). This is the Homeric account; but the more common tradition related that Theseus deserted Ariadne in Naxos, where she was found by Dionysus, who made her his wife, and placed among the stars the crown which he gave her at their marriage.

Ariadne Deserted, original in marble in the Vatican.

Ariadne and Panther. Among the productions of modern sculptors, the Ariadne of Dannecker, at Frankfort-on-the-Main, which represents her as the bride of Theseus riding on a panther, justly enjoys a very high reputation.

Aristides, a celebrated Athenian, whose great temperance and virtue procured him the surname "The Just." He was a rival of Themistocles, through whose influence he was banished, B. C. 481, but before six years of his exile had elapsed, he was recalled by the Athenians.

Aristotle, the greatest and most influential of all the Greek philosophers, was born in the year 384 B. C. He aspired to the cultivation of universal knowledge for its own sake, in which he obtained a distinction without parallel in the history of the human race. At Athens he became the pupil of Plato, but soon made his master aware of the remarkable penetration and reach of his intellect, for we are told that Plato spoke of Aristotle as the "Indisputable of the School." At the age of fifty he opened a school called the Lyceum, and from his practice of walking up and down in the garden during his lectures arose the name of his school and so of the Peripatetic. No other philosopher can be named whose influence has been so far reaching and so long continued.

Arrotino, Knife Grinder. The statue sharpening his knife. An ancient statue now in the Louvre, France. It is as well known as the statue of an old man, who is seated stationary under a tree, leaning against a trunk. Indeed, whether it is a statue of an old man, or of a knife grinder, it is a masterpiece of power, truth, and beauty.

Atlas. A Titan, who, according to the ancient Fables, bore the weight of the firmament on his shoulders. He is represented as a man with a lion's head, and a lion's body, and a lion's tail. He is shown in a very powerful and muscular form, and is often depicted as a man with a lion's head, and a lion's body, and a lion's tail.

Auber, Daniel Francois Esprit, a French musician and composer, born 1784 and died 1871. After a brief experience in mercantile life, he devoted himself to music. After a course of study with Cherubini, he wrote several operas which were unsuccessful. Persevering, however, he was recognized in 1820, and from that time on he produced a great number of works, almost all of which were well received, while some are among the most successful operas now represented on the stage. *Masaniello, Fra Diavolo, Gustave* and *Hugbo* are among his most popular operas.

Aurelius, Marcus, born at Rome, A. D. 121, died A. D. 180, Roman Emperor from 161 to 180 A. D. Marcus Aurelius was a devoted advocate of the Stoic philosophy. We still possess a work in the Greek language written by him, and entitled *Meditations*. No remains of antiquity possess a nobler view of philosophical heathenism. The chief stain upon his character was his persecution of the Christians.

Augustus, Caesar, was born in 63 B. C. Julius Caesar adopted him as his son and heir, his father having died when he was but four years old. When Caesar died in 51 B. C. Augustus was a student under the celebrated orator Apollodorus. When he returned to Italy he was haughtily treated by Antony, who refused to surrender the property of Caesar. Augustus made himself a favorite with the people and succeeded in getting the will of Caesar carried out. Augustus had consummate tact as a ruler and politician, and could keep his plans in secrecy while he made use of the passions and talents of others to forward his own designs. He so beautified Rome that it was said, 'Augustus found the city built of bricks, and left it built of marble.'

Bacchus, the noisy, or riotous god, synonymous with Dionysos, the youthful, beautiful and effeminate god of wine.

Bacchus and Ariadne. Bacchus, the god of wine, and Ariadne, daughter of Minos, King of Crete. Bacchus, returning from his triumphs in India is captivated by her beauty and marries her. At her death, he gives her a place among the gods, and her wedding crown is suspended in the skies as a constellation.

Bacchus—See Silenus and the Infant Bacchus.

Bacchus—Original at the Louvre.

Bach, Johann Sebastian, a famous German composer and musician. Born 1685 and died 1750. Bach was in some respects the greatest musician that has lived. He early began the study of music, playing on the harpsichord and organ. He filled the position as organist in Arnstadt at 22, and in 1708 became court organist in Weimar. His principal compositions for the organ date during the seven years of his service there. His field of labor was enlarged from year to year, until at the age of thirty-eight Bach devoted himself to teaching and to working out his lofty conceptions of the musical art. For twenty-seven years he thus lived and labored, leaving as the fruit of those years a mass of compositions which, for number, variety and excellence, form perhaps the most astonishing monument of musical genius and learning. The *Welltempered Clavier* is known to every earnest student of the piano-forte.

Bacon, Francis, an English philosopher, born 1561 and died 1626. A great and luminous intellect, one of the finest of the poetic progeny of his age, who, like his predecessors, was naturally disposed to clothe his ideas in the most splendid dress. He was a scholar, a lawyer, a statesman and a philosopher; and of the most original and brilliant of the men of the world. Countless are the credits from him, his *Idol of the Trinity*, and *Advancement of Learning*, and the foundation of the true scientific method, which changed the philosophy of the world.

Beatrice—The Christian name of a young Florentine lady of the illustrious family of Portinari, for whom the poet Dante conceived a strong but purely platonic affection, and whom he represents, in the "Divina Commedia," as his guide through Paradise. Beatrice married a nobleman, Simone dei Bardi, and died young, about the year 1290.

Beecher, Henry Ward, was born in 1813 and died in 1887. He graduated at Amherst in 1834, and studied theology at Lane Seminary. In 1837 he became pastor of a Presbyterian church at Lawrenceburg, Indiana. In 1847 he received a call from the Plymouth church, a new Congregationalist organization in Brooklyn, New York. Here, almost from the outset, he began to acquire that reputation as a pulpit orator which he maintained and increased till his death. He contributed regularly to periodicals, and wrote books on many subjects, from the novel "Norwood" to his "Life of Christ." In 1863 he visited Great Britain and did much by his speeches to change popular sentiment regarding the meaning of the Civil War.

Beethoven, Ludwig van, a Prussian musical composer, born 1770, and died 1827. Commencing the study of music at the early age of four, he developed powers that made him the greatest musical genius of the age. His mission was to perfect instrumental music as the language of feeling and of the sentiments. In his earliest works will be found much of that pensive feeling which distinguished his extemporaneous efforts, and this quality in his sonatas became more marked as he advanced in years. In the catalogue of Beethoven's works, we find hardly a branch of the art in which he had not wrought, but the preponderance of the instrumental over the vocal music is striking.

Belt Bucklers—By John Peter Molin, a Swedish sculptor. The subject here treated was taken from Swedish history. In early days it was customary at large public gatherings for the men to engage in various contests of strength and skill, one with another. Wrestling, fencing, etc., were most commonly practiced, and when bad blood became aroused, these contests often had a fatal ending. When, says the history, a controversy had arisen between two men, one of them would challenge the other by proposing that they should *buckle their belts*; which were then fastened around the waists of both to hold them together. The next question of the challenger was "*How far can'st thou stand the cold steel?*" in reply to which his adversary would mark on the blade of the knife, used in the fight, how far he would allow it to be inserted into his body. Each party then had a right to hold with his left hand the right wrist of his opponent, and the fierce struggle for mastery commenced. This wild usage was quite common up to the beginning of the 18th Century. Molin's group represents one of these fights for life at a very critical moment, as is revealed by the strained muscles and countenances of the combatants. Four tableaux in relief on the sides of the pedestal serve further to illustrate the story of the fight.

Benivieni, Girolamo, a Florentine poet, born 1433 (?) died 1542. An ornament of Italian literature. He sought to imitate Dante and Petrarch. He was pious, holy, and upright, and lived to the age of 90 years. A bust of Benivieni made by Bastianini, was bought for the Louvre at a fabulous price. The modeling was so beautiful as to have passed for a genuine mediæval work.

Bismark, Comte von, a man of mighty will and intellectual forecast, whose great life-work has been to unite Germany. He was born April 1st, 1815. In 1832 he studied jurisprudence and political science at Göttingen. In 1847 he attended the first united diet at Berlin as delegate from

Saxony, and became known as an able and vehement opponent of liberal reforms. As a member of the second chamber of the Prussian diet in 1849-50, he urged increased powers for the monarchy and the consolidation of the German nationality. Was ambassador to St. Petersburg and Paris, 1859-62, and in 1862 became prime minister. His policy, at first so unpopular, gained for Prussia victory and renown, and the confederation of the German states is considered as chiefly due to his diplomacy and ability.

Boxer—By Canova. A most beautiful example of muscular development. The great sculptor has shown a wonderful knowledge of anatomy and the human form in action. The statue is one of Canova's heroic compositions.

Boy with Goose—Marble group in the Louvre. Was found in 1789 at Civita Vecchia, Appian way. Thought to have been copied from a bronze work by Berthos. The group probably served as a fountain, the water issuing from the bill of the goose. The composition is simple and beautiful, and the execution worthy of an original artist.

Boy with Turtle, in the Louvre. By Francois Rude, born at Dijon, 1784. From a marble bust he made a triangular piece left, and from this he made his *chef-d'œuvre*—"The Neapolitan Fisher Boy Playing with a Turtle." This charming work it is impossible to praise too highly. It has all the purity and restraint of an antique, with the freedom and animation of a figure modeled direct from nature. The delight of the boy at having reined his turtle contrasts amusingly with the lugubrious expression of the poor reptile, unable to retreat under its shell. The work was bought by the Government and the sculptor decorated; but at the moment of his triumph Rude lost his only son and his health began to fail. Died 1855.

Brontolone. See Bourdaloue.

Bourdaloue, Louis, a celebrated preacher, and one of the greatest orators that France ever produced, was born at Bourges, Aug. 20, 1632. Madame de Sevigné, wrote that "she had never heard anything more beautiful, more noble, more astonishing, than the sermons of Father Bourdaloue." Louis XIV said that "he loved better to hear the repetitions of Bourdaloue than the novelties of any one else." Lord Broctham says of him:—"He displayed a fertility of resources, an exuberance of topics, whether for observation or argument, not equaled by any other orator, sacred or profane."

Brutus, Lucius Junius, one of the assassins of Cæsar, overthrown the monarchy of Rome and established the republic. He sacrificed to the new republic even his own sons, having been detected in a conspiracy to restore the monarchy.

Burns, Robert, a Scottish poet, born 1759, died in 1796. Seldom have such manliness, tenderness and passion been united as in the songs of Burns. The popularity that his poems instantly attained, has continued unabated wherever English is spoken. Intemperance, exposure and disappointments helped to undermine his constitution, and he died at the early age of 37.

Byron, Lord George Gordon, an English poet, born 1788 and died 1824. He was predisposed to poetry by his innate fire, but limited to one kind. He wrote *Childe Harold*, *The Corsair*, *The Bride of Abydos*, *The Prisoner of Chillon*, *Manfred* and the *Lament of Tasso*, *Don Juan*, and *The Vision of the Last Judgment*.

Cæsar, Caius Julius, Roman general and dictator, born B. C. 100, and died by assassination B. C. 44. Cæsar had a wonderfully fertile mind. He was not only the first general and statesman of his age, but he was—excepting Cicero—its greatest orator. As an historian he has never been surpassed and rarely equalled in simplicity of style, and in the truthful representation

Diana di Gabii, marble in the Louvre. This statue takes its name from the place where it was found in 1792. It is also called *Atalanta adjusting her robe*. This statue is unequalled in point of maidenly grace, in the purity of expression, and in its exquisite lines of drapery.

Dickens, Charles, English novelist, born 1812 and died 1870. Dickens was a very prolific writer, and among his list of works may be mentioned *Nicholas Nickleby*, *Old Curiosity Shop*, *Doombey and Son*, *David Copperfield*, *Pickwick Papers*, *Bleak House*, *Hard Times*, *Tale of Two Cities*, *Our Mutual Friend*.

Diesterweg, Friedrich Adolph Wilhelm, great German educator, born 1790 and died 1866. Diesterweg was director of the seminary for teachers of city schools in Berlin, from 1832 to 1850. He wrote numerous text-books on mathematics and geography, and several manuals for teachers. He advocated the theories of Rousseau, Pestalozzi, and modern liberalism in general, and was constantly engaged in polemics on school reform.

Diomedes. A hero in the Ætolian and Argo-Theban legends. The leader of one of the Greek tribes. A favorite of Athene, from whom he received the gift of immortality. He carried off the Trojan Palladium and brought it to Argos.

Discobolus of Myron, in the Vatican. The original was found in Hadrian's villa in 1791, and placed by Pius VI in the Vatican. Myron, of Athens, was one of the most famous sculptors of his age. His favorite theme seems to have been the human figure in intense action.

Discobolus of Naucydes, marble in the Vatican. The original was found on the Appian way at Rome. The athlete, with quoit in hand, is standing quietly, collecting his powers for the crowning effort. He is about to take his position ready for the throw, and is measuring the ground with his eye. The discus was a round flat plate of metal or stone, about ten or twelve inches in diameter, and when thrown it took a rotary motion. Discobolus means quoit-thrower.

Donatello or Donato, Italian sculptor; born 1383, died 1466. There exist 40 works of Donatello of unquestioned authenticity, and 31 respecting which controversies have arisen, and 25 recorded by his contemporaries, but no longer found, must be added to the number. He was much admired and patronized by Cosmo and Pietro de Medicis. His greatest works are his Baptist, David, Judith, St. George and St. Mark.

Dryden, John, was born in 1631 and died in 1700. He was of a good family and brought up in an excellent school. In spite of several falls and many slips he shows a mind constantly upright. He wrote in a classical style. The greatest part of Dryden's poems are imitations, adaptations, or copies. He was more a rhymster than a poet. His most famous poems are argumentative and satirical.

Dying Gaul, marble in Capitoline Museum, Rome. Thought to represent a savage Gaul, who has stabbed himself to avoid captivity, and fallen upon his shield, his sword lying beside him.

Emerson, Ralph Waldo, born 1803, and died 1882, an American essayist and poet. Graduated at Harvard University in 1821, he became pastor of a Unitarian congregation in Boston in 1829. Three years later he resigned his office, spent a year in England, and then led a quiet, retired, meditative life, chiefly at Concord. He wrote many essays and delivered lectures.

Erato, original in British Museum. The muse of erotic poetry and mimic imitation. Sometimes also represented with the lyre.

Eros (Amor). Among the most celebrated is the Torso (mutilated statue) of the Vatican. Eros was commonly reputed

the son of Aphrodite and Ares, and was generally depicted as a boy of wondrous beauty, on the verge of youth. Eros was regarded as the author of love and friendship between youths and men. On this account his statue was generally placed in the gymnasia between those of Hermes and Hercules.

Eros, Amor, or Cupid. The god of love. (See Amor).

Euripides, the most distinguished Greek poet, born at Salamis, B. C. 480, died B. C. 406. He lived on intimate terms with Socrates. He represents men, according to the remark of Aristotle, not as they ought to be, but as they are. Hence the preference given to his plays by the practical Socrates. His great excellence is the tenderness and pathos with which some of his characters are invested. Eighteen of his tragedies are extant.

Euterpe, marble in Louvre. The inventress of song and wind instruments is here crowned, and holding a pipe or flute in each hand. Remarkable for its pleasant air, easy attitude, and graceful drapery. It was once in the Villa Borghese.

Faun, Barberini, in Glyptothek, Munich. In this fine work we have a highly realistic representation of a youthful Faun stretched on a rock, partly covered by the hide of some animal, sleeping off the effects of intoxication.

Faun—Satyr. Capitol, Rome. By Praxiteles. Praxiteles is known to have made at least three satyrs, but as there remains no description of any of these, it is impossible to say which is reproduced in this figure. Hawthorn, speaking of this satyr in his "Marble Faun," says: "Only a sculptor of the finest imagination, the most delicate taste, the sweetest feeling, and the rarest artistic skill—in a word, a sculptor and a poet, too—could have first dreamed of a Faun in this guise, and then have succeeded in imprisoning the sportive and frisky thing in marble. Neither man nor animal, and yet no monster; but a being in whom both races meet on friendly ground."

Faun, by M. Angelo. Museum at Florence. We have in this statue a representation of a Faun treading the scabellum. The foot is raised and placed on the high wooden shoe with which he is beating time.

Faun—With Kid. Marble at Madrid. The springy step and upward turn of the head of this Faun, together with the struggling kid, make a rustic group of great spirit.

Fighting Gladiator. This most spirited of all statues was found on the coast of Actium, and is a specimen of Greek sculpture of the Fourth Epoch. It is now thought that this statue does not represent a gladiator, but a foot soldier, defending himself against a horseman. Whatever may be the character represented, it is certainly a most perfect masterpiece of art.

Flora was the goddess of blossoms and flowers, and was held in great honor in Italy. Artists have represented Flora as the season of spring in the guise of a beautiful girl crowned with flowers.

Franklin, Benjamin, American philosopher and statesman; born 1706, and died 1790. Early fond of reading and study he soon commenced to write short articles for the press. He learned the printer's trade with his brother in Boston. In 1723 he went to Philadelphia and soon gained the reputation of a good workman. After spending eighteen months in England he returned to America, and in 1730 founded the "Pennsylvania Gazette." He rose rapidly in the estimation of his fellowmen, and was honored by positions of trust. He studied, and by conducting experiments was able to advance the science of electricity. He was a staunch patriot during the Revolutionary War, and was sent with commissions to England and to France, which he dis-

Helen of Troy was of surpassing beauty. In her youth she was carried off by Theseus and Pirithous to Attica, from where her brothers, Castor and Pollux, liberated her. She was married to Menelaus, but subsequently carried away by Paris. Hence arose the celebrated Trojan war.

Hercules Farnese. Museum of Naples. This statue was found in 1540 and brought by Caracalla from Athens to Rome, and in 1786 to Naples. The legs were at first missing, but they were found twenty years later. This colossal statue is one of the most celebrated of antiquity. The god is resting on his club, after taking the apples of the Hesperides which he holds behind him in his right hand. The smallness of the hand indicates the school of Lysippus. Of all the Greek myths, the myth of Hercules (Hercules) is the most glorious. The first proof of his divine origin was in the strangling of two serpents sent to destroy him, when he was but a babe. He was a shepherd until he was eighteen. After attaining his growth he slew the lion of Cithæron, and led a successful expedition against the King of Orchomenus, freeing the Thebans from future tribute. It is impossible in this short sketch to describe the twelve great labors of Hercules, imposed upon him, and the other deeds for which he was famous.

Hermes—By Praxiteles. Hermes of Praxiteles, original at Athens, found 1877, in the ruins of the temple Hera, at Olympia. The first statues of the god founded on the ancient Hermæ, represented him as a shepherd, always as a powerful bearded man. Later he assumed a more youthful appearance, and was represented as a beardless youth in the very prime of strength, with broad chest, lithe powerful limbs, curly hair, and small ears, mouth and eyes. Altogether a wonderful combination of grace and vigor. If we add to this the expression of kindly benevolence which plays around his fairly cut lips, and the inquiring look of his face as he bends forward thoughtfully, we have the principal characteristic features of the god.

Hero was a priestess of Aphrodite (Venus), in Sestus. Leander, the famous youth of Abydos, swam across the Hellespont every night to visit Hero. One night he perished in the waves; and when his corpse was washed up on the coast of Sestus next morning, Hero threw herself into the sea.

Hippocrates, the most celebrated physician of antiquity, was born in the island of Cos, about B. C. 460. Hippocrates traveled much and was held in high esteem by his contemporaries. He raised medicine from a system of superstitious rites, practiced wholly by the priests, to the dignity of a learned profession. He wrote many works on medicine.

Homer, the great epic poet of Greece, was born about B. C. 850. He is universally regarded as the author of the two great poems—the Iliad and the Odyssey.

Humboldt, Friedrich Heinrich Alexander von, German naturalist, born 1769, died 1859. Baron von Humboldt was educated at home with special care in the natural sciences. He studied at several universities and at the mining academy at Freiberg. He made frequent excursions to different parts of Germany, and traveled all over Europe, making botanical and geological observations. He spent five years in traveling in South America and Mexico, and undertook an expedition to northern Asia. The results of his travels and studies were published in numerous volumes of great scientific value. His last great work was the *Kosmos*.

Hygieia, the goddess of health, daughter of Æsculapius, is represented with a serpent, the symbol of health, drinking from a cup she holds in her hand.

Irving, Washington, American author, born 1783, died 1859. Irving studied law at sixteen, but having no inclination for the profession engaged in commerce with his brother, as a silent partner, but devoted his time to literature. Among his works may be mentioned his *Sketch Book*, *Life and Voyages of Columbus*, *Conquest of Granada*, *The Alhambra*, *Crayon Miscellany*, *Life of Goldsmith*, *Life of Washington*.

Isis, one of the chief Egyptian divinities. She was originally the goddess of the earth, and afterwards of the moon. The Greeks identified her both with Demeter (Ceres) and with Io. Her worship was introduced into Rome towards the end of the republic.

Jackson, Andrew, seventh president of the United States, born 1767, died 1845. Jackson's early education was limited. He enlisted in the army at 13 and was able to see some of the closing skirmishes of the Revolutionary War. Soon after being released from imprisonment his mother died, and he was left utterly destitute, his father having died about the time of his birth. He commenced to study law at 18 and at 20 was admitted to the bar. His practice was in Nashville, Tenn., and was large. In 1796 he was elected to represent the new state of Tennessee. In 1812, when war was declared against England, Jackson tendered his services, which were valuable to his country. In 1828 he was elected to the Presidency and served eight years. He commenced a course of rigorous government, which he maintained during his term of office. Leaving Washington, he retired to private life, and resided at the Hermitage until his death, ever taking a lively interest in politics, and especially in the welfare of his party.

Jahn, Friedrich Ludwig, a German patriot, and founder of gymnasia in Germany for physical culture, born in 1778, died 1852. From patriotic motives he established gymnasia where young men were fitted to endure the fatigues of war. From these gymnasia, which spread over Germany, is derived the *Turnkunst*, or system of physical culture.

Jason, grew up in Chiron's cave, a favorite with gods and men. After completing his twentieth year he demanded of his uncle his rightful inheritance, who declared that he would resign the crown if Jason would recover the golden fleece from Colchis. Jason, like a true hero, at once accepted the perilous adventure. Thence the expedition of the Argonauts. He is here represented hurriedly tying on but one sandal, in his haste to seek his uncle Pelias.

Jefferson, Thomas, third President of the United States, was born in 1743, and died July 4, 1826. He had excellent school advantages, and after remaining at the college of William and Mary, he commenced the study of law. In 1774 he prepared a document which was a bold, elaborate, and eloquent exposition of the right to resist taxation, and contained the germ of the Declaration of Independence. This and other papers placed him before the country as a courageous and uncompromising advocate of constitutional freedom, and as an accomplished and eloquent writer. His work in Congress was valuable and his diplomatic functions were performed with marked ability. He served as President for two terms with marked vigor. He was ardently devoted to states rights, but his views were modified when he was President, and he became convinced that the federal government must "show its teeth." He was regarded as the epitome and incarnation of democracy, as opposed to the old world of aristocracy.

Jeremiah, a Hebrew prophet, was the son of Hilkiah, a priest of Anathoth, near Jerusalem. He prophesied from 630–590 B. C., and even later.

Juno. The Roman goddess of marriage, woman, sex, and domestic affairs, was supposed to be identical with the Greek Hera, sister and wife of Zeus (Jupiter). In the *Iliad*, Hera is to be seen accompanying us with the same reverence as her husband. Zeus takes pleasure in her counsels, and communicates his secrets to her. She is, notwithstanding, far inferior to him in power, and must obey him unconditionally. She is not like Zeus, the queen of gods and men, but simply the wife of the supreme god. **Juno-Ludovisi** is the most celebrated of the art monuments that relate to Juno. The Juno of the Capitol is in the Capitoline Museum at Rome.

Juno Barberini, original in the Vatican, Rome, was found by Cardinal Barberini.

Jupiter. The Roman Jupiter is the Greek Zeus, the life giver, the creator, the ruler of heaven and earth. No ancient statues of any merit have been preserved, but in numerous antique gems fine busts of Jupiter have been found, which, no doubt, are copies of the former excellent statues. The bust of Zeus in Carrara marble—now in the Vatican Museum at Rome—which was discovered in the last century at Otricoli, is the first in point of artistic worth. "The mighty looks raised in the center, and falling down on both sides, the compressed forehead with the bold, arched eyebrows, from under which the large eyes seem to glance over the universe, the broad projecting nose express energy and wisdom, while a mild benevolence rests on the full, parted lips, and the luxuriant beard and rounded cheeks show sensual power and imperishable manly beauty."

Laocoon, a Trojan priest of the Thymbraean Apollo. He tried in vain to dissuade his countrymen from drawing into the city the wooden horse which the Greeks had left behind them when they pretended to sail away from Troy. As he was preparing to sacrifice a bull to Poseidon two fearful serpents swam out of the sea, coiled around Laocoon and his two sons, and destroyed them. His death forms the subject of a magnificent work of ancient art preserved in the Vatican.

Lessing, Gotthold Ephraim, a German author, born 1729, and died 1781. Lessing studied at Leipzig, his father desiring him to study theology, but his restless and inquiring disposition soon directed him from theology and he acquired a passion for the theater. He commenced writing dramatic pieces and poems. His writings gradually extended over a wide field until they covered many departments of literature and art. Lessing has done much to give to German literature its present many-sided character, and to strengthen German criticism by a study of art. *Minerva*, *Die Rabalder*, *Laokoon*, *Nathan der Weise*, and *Die Erziehung des Menschen*, are some of his principal works.

Leucethen. Her first name was Leno. Having excited the anger of the goddess Juno, she fled, and being pursued, she precipitated herself into the sea, and became a sea nymph, her legs being changed into gills by the white goddess. Her son, Polydorus, was the first victim of the Chalybes.

Lincoln, Abraham, the great president of the United States, was born in 1809. He was elected president in 1860, and re-elected in 1864. He was assassinated by John Wilkes Booth on the 4th of April, 1865. He was a great lawyer, statesman, and orator. His great work was the Emancipation Proclamation, which freed the slaves. He was a great friend of the poor and the oppressed. He was a great lover of his country. He was a great man of peace. He was a great man of war. He was a great man of all things.

during the civil war need not be given here, as it is familiar to all. At the close of the war he was assassinated on the 15th of April, 1865.

Liszt, Franz, Hungarian pianist and composer; born 1811, died 1886. At six years of age he manifested so extraordinary an aptitude for music, that his father, himself a musician of some repute, thenceforth carefully instructed him on the pianoforte. He was instructed by masters in Vienna, after which he appeared in concerts with great success. The death of his father made a deep impression upon him and he surrendered himself to gloomy fancies and religious rhapsodies. He retired from the world for several years, and almost wholly relinquished his art. In 1835 he re-appeared in Paris and was received with great éclat. He now gave concerts in Italy and Vienna, and throughout Europe; his career was a succession of triumphs. In 1847 he became conductor of the court concerts and the opera at Weimar. He was one of the most prolific composers of his generation. As an interpreter of Bach, Handel, Beethoven and the older composers, he stood pre-eminent.

Longfellow, Henry Wadsworth, American poet; born 1807, died 1882. Graduated at Bowdoin College in 1825. He traveled much in Europe, and was professor of modern languages at Bowdoin, and later at Harvard. He began his literary work while a student at Bowdoin, and while professor contributed many able articles to the *North American Review*. Among his poems may be mentioned *Hiawatha*, *Evangelina*, *Miles Standish*. His works are much read in Europe, and have been translated into most of the Continental languages.

Lucius Verus. (See Verus).

Luther, Martin, the greatest of the Protestant reformers of the 16th century; born 1483, died 1546. He studied at the university at Erfurt for the legal profession. Later, however, he entered a convent to devote himself to a spiritual life. In 1507 he became a teacher in the University at Wittenberg. On his return from a visit to Rome, his work as a reformer commenced. He attacked the abuses and the doctrinal system of the Church of Rome, and defended his position before the assembled powers of Germany. He translated the Bible in his seclusion which followed. Later he taught by word and published works in the doctrines of the Protestant faith until his death.

Madonna of Nuremberg. This beautiful figure carved in wood of life size, is found in the Convent at Landau. Sculptor unknown.

Mars was the god of war—one of the gods of Olympus.

Medici, Giuliano de, an ideal portrait by Michael Angelo. Giuliano was a son of Pietro de Medici, and brother to Lorenzo, the Magnificent. He was assassinated during divine service by conspirators in Florence.

Medici, Lorenzo de, surnamed the Magnificent; born 1448, died 1492. He early displayed extraordinary talent; in poetry, in his great penetration, great courage and good sense, he rendered himself conspicuous. Although dignified, he had pleasing manners. Lorenzo was educated by the first scholars of the age; and later traveled much. After his father's death he was requested to assume the administration of the Florentine republic. He became eminent as a statesman. He had incurred the displeasure of Pope Sixtus IV, which would have led to war, but was averted by his courage and magnanimous behavior. Two attempts were made to assassinate him. Lorenzo was a magnificent patron of authors and artists, and spent much money for public edifices, schools and libraries.

Medusa Rondanini, Glyptothek, Munich. In this Medusa is represented a monster who created terror by her ugly

ness, but a being possessed of great beauty whose power came from her coldness and want of all feeling.

Mendelssohn Bartholdy, Felix, German musical composer; born 1809, died 1847. His early education was carefully attended to, having had the best of instruction. He wrote works at 15 which are still regarded as classical music. He gave successful concerts in Paris. He was more appreciated in England than at home. His greatest oratorios are *St. Paul* and *Elijah*, and his overture to Shakespeare's "Midsummer Night's Dream." Mendelssohn was as beloved for his character as he was admired for his genius.

Menelaus and Patroclus. See Ajax and Achilles.

Mercury, the Greek god, Hermes, the son of Zeus and Maia. Various attributes are assigned to him, according to the different countries where he was deified. He is, therefore, represented as the god of speech, of eloquence, of the sciences, of traffic, and of herds; as the messenger, herald and ambassador of the gods.

Meyerbeer, Jakob, great German composer; born 1794, died 1864. After studying music in Germany and composing several operas, he removed to Italy to study the Italian style. He composed and produced the great operas *Cruciani*, *Robert le Diable*, *Les Huguenots*, *Le Prophète*, *Pierre le Grand* and *Dinorah*.

Milton, John, English poet; born 1608, died 1674. Milton was carefully nurtured and educated by private tutor and in college; he took his degree in 1631 and left Cambridge, having relinquished the idea of following law or divinity. He went to reside in his father's house studying and composing. After the execution of King Charles, he was appointed Latin Secretary to the Council of State. Unceasing study ruined his eyesight. Milton was above all English poets, stately and grandiose. For massiveness of thought and sublimity of imagery his epic poem, *Paradise Lost*, stands without a rival.

Minerva, called Athena by the Greeks, was one of the great Roman divinities. She was worshipped as the goddess of wisdom and the patroness of all the arts and trades. Minerva also guided men in the dangers of war, where victory is gained by prudence, courage and perseverance. She was further believed to be the inventor of musical instruments, especially wind instruments, the use of which was a very important part of religious worship. Pallas Giustiniani, or Minerva Giustiniani, of the Vatican Museum at Rome, is held to be the finest among existing full-length statues.

Minerva Medica. The Pallas Athene of the Vatican. It was found in the temple of Minerva Medica on the Esquiline, Rome.

Moltke, Count von, was born in Mecklenburg, 1800. He entered the Prussian army when he was 22 years of age; became major-general in 1856 and chief of royal staff 1858; lieutenant-general in 1859, and was created a count in 1870. In 1874 and 1877 he was elected to the Reichstag and also made a life member of the Upper House.

Montefiore, Sir Moses, English Jewish philanthropist; born 1784, died 1885. Montefiore was married to a sister-in-law of Nathan Meyer Rothschild, the founder of the London branch of that house. He visited Palestine several times and was much interested in the Jewish colonies there, aiding them in various ways. He secured from the different governments concessions which looked to the amelioration of the condition of the Jews in those countries. His charity was unbounded.

Moses, the Jewish law-giver. Moses in his infancy having fallen into the hands of the daughter of Pharaoh, she raised him. He received his education at the court. Leaving the court when arrived at manhood, he devoted his life to his people, being their teacher and lawgiver.

Mozart, Wolfgang, one of the greatest of musical composers; was born 1756, and died 1791. At the age of four he played the clavichord and composed a number of minuets. At six he played in public and astonished old musicians by his organ playing. His father traveled with him until he was ten, exhibiting his wonderful skill before crowded houses. At thirteen he traveled with his father to Italy, where he created an unheard-of enthusiasm by his performances and compositions. At sixteen he was the first clavichordist in the world. In 1779 he was appointed composer to the royal court at Vienna, where he fixed his residence, and there the musical works were composed upon which his fame chiefly rests. His great opera, *Idomeneo*, was composed in 1780. The opera forms an epoch in the history of music. In 1787 he produced *Don Giovanni*; in 1791 his *Zauberflöte*, *La Clemenza di Tito*, and the sublime *Requiem*, composed in anticipation of, and finished only a few days before his death.

Myrina. Myrina was a queen of the Amazons of Libya.

Napoleon, Bonaparte, Napoleon I, Emperor of the French; born 1769, died 1821. Napoleon was admitted to the military school at Brienne, in 1779, and in 1784 to the school at Paris, to complete his studies, and entered the army as lieutenant of artillery in 1785. At the siege of Toulon, in 1793, he displayed extraordinary military intelligence and activity, and laid the foundation of his whole subsequent career. His campaigns in Italy and the wars of Europe, whereby he subjected nearly all of Europe, his Egyptian campaign, his defeat in Russia, and his final defeat at the battle of Waterloo, have become part of the world's history, and effected great changes in the dynasties of Europe. Napoleon was made First Consul of France in 1799, and assumed the title of Emperor in 1803. He was compelled to abdicate in 1815, and died as a prisoner on the island of St. Helena, in 1821.

Narcissus, original at Naples, found in 1870 at Pompeii. A beautiful youth, who was inaccessible to the feeling of love. The nymph Echo, who was enamored of him, died of grief. But Nemesis, to punish him, caused him to see his own image reflected in a fountain, whereupon he became so enamored of it that he gradually pined away until he was metamorphosed into the flower which bears his name.

Nero, a Roman Emperor; born A. D. 37, died by his own hand in 68. Under the care of the philosopher Seneca, he is said to have made some progress in learning, and in his sixteenth year he delivered an oration in Greek. The first five years of his reign were marked by clemency and justice. After which he gave himself up to a dissolute life. Chariot racing, music, and every frivolous amusement engrossed his time. The military events of Nero's reign were glorious to the Roman arms. He was finally condemned to death, but committed suicide in the presence of the soldiers who came to seize him.

Newton, Sir Isaac, English philosopher and mathematician; born 1642, died 1727. Newton received his early education at the grammar school near home. He left home for Cambridge in 1661, and immediately devoted himself to mathematical studies. His progress was rapid and he had soon mastered all the works then existing. His progress in these studies was accompanied by the discovery of laws in nature, and after the discovery of the law of universal gravitation and its application, became absorbed in investigations into the nature of light and the construction of telescopes. He sat in Parliament, and was Warden of the Mint for 31 years.

Night, by M. Angelo, original over the tomb of Giuliano de Medici, in the church of St. Lorenzo, at Florence.

Niobe, by Giovanni Stanetti, King of the Troad. The proud mother of seven children, who were all slain by Apollo and Artemis, is represented as sitting in a garden with the corpses of her children at her feet, and opposing into stone.

Niobid, by Giovanni Stanetti. This is considered the finest of the whole group of fourteen figures, in Florence. The group consists of Niobe and her youngest daughter, three other daughters, the preceptor and youngest son, and five other sons. Of the many copies of members of the group, the daughter of Niobe in the Vatican stands unrivaled.

O Connell, Daniel, Irish orator and political agitator; born 1775, died 1847. O'Connell received a good education, was called to the bar in 1798, and soon became distinguished as a brilliant and successful advocate. He had no sympathy with the violent revolutionary spirit of the period. He became gradually absorbed in politics, and was soon the acknowledged leader of political reform in Ireland. Through his efforts Parliament repealed the civil disabilities to which Catholics had been so long subject. He addressed monster meetings in Ireland, making the most exciting speeches. These meetings were stopped by the government and O'Connell arrested and fined as a conspirator. Upon appeal to the house of lords the decision was reversed. O'Connell grew feeble, and early in 1847 set out on a journey to Rome, but died on the way at Genoa.

Omphale was a queen of Lydia. It is related that Hercules served her as a slave for three years, he sometimes wearing her dress, while Omphale put on the skin and carried the club.

Orpheus, Eurydice and Mercury, bas-relief in the Villa Albani, Rome. This relief represents the tragic moment in the story of Orpheus when he turns to look at Eurydice as she is led out of Hades. At the left is Mercury, who has accompanied Eurydice, and now takes her hand to lead her back.

Paris, second son of Priam and Hecuba. Paris, by carrying off Helen, the wife of Menelaus provoked the Trojan war.

Penelope, in Homeric legend the wife of Ulysses and mother of Telemachus.

Pericles, the most accomplished statesman of ancient Greece, was born of distinguished parents in the early part of the fifth century B. C. He received an elaborate education, and was conspicuous all through his career for the singular dignity of his manners, the "Olympian" thunder of his eloquence, his sagacity, probity and profound Athenian patriotism. So transcendent were his abilities, that he rapidly rose to the highest power in the state, as the leader of the dominant democracy, Greek architecture and sculpture under his patronage reached perfection. To Pericles Athens owed the Parthenon, the Propylæa, the Odeum, and other edifices. He died in 429 B. C.

Pestalozzi, Heinrich Johann, Swiss educationist, born 1766, died 1827. Through the reading of Rousseau's *Emile* he was induced to devote his legal and historical studies and engage in social and educational reform. By opening educational institutes and by his writings he gave to the world a fine exposition of his educational views.

Plato, Greek philosopher, born at Athens, between 428 and 423 B. C. Plato, a student of Socrates, and one of the most important of the philosophers of antiquity, was the founder of the Academy at Athens. He was a pupil of Socrates, and a teacher of Aristotle. He was a student of Socrates, and a teacher of Aristotle. He was a pupil of Socrates, and a teacher of Aristotle.

Polyphemus, a Cyclops, the son of Poseidon, who was blinded by Ulysses. He was a giant, and was the only one of his kind who was not blinded by Ulysses.

melody around her. The statue was once in the Villa Borghese. In addition to its air of listening repose, the figure is an admirable model of drapery.

Polyphemus, son of Neptune, was the most celebrated of the fabulous Cyclops, who inhabited the island of Sicily. He was of immense size and had but one eye. When Ulysses landed on that island he was confined in the cave of Polyphemus with twelve companions of which Polyphemus killed six. The others were expecting the same fate, but Ulysses made Polyphemus drunk and then with a blazing torch put out his eyes and escaped, leaving the blinded monster to grope about in the darkness.

Prometheus Bound, original in National Gallery, Berlin, by Edward Mueller. According to one account the Titan Prometheus was the creator of mankind. He is said to have stolen fire from heaven and to have taught its use to man. As punishment for this Zeus ordered Prometheus to be chained to a rock, where, during the day time, an eagle devoured his liver, which always grew again during the night. Prometheus was thus exposed to perpetual torture; but Hercules killed the eagle and delivered the sufferer, with the consent of Zeus. Albani, a modern Italian sculptor, executed a group of Prometheus. It is considered very fine.

Psyche, "the soul," occurs in the later times of antiquity as a personification of the human soul. In works of art Psyche is represented as a maiden with the wings of a butterfly. She is often seen in connection with Amor (Cupid). Amor enables her to bear the hard and humiliating labors imposed upon her by Venus, under which she is suffering and almost perishing.

Pudicitia, Berlin, a personification of modesty, was worshipped both in Greece and at Rome.

Rape of the Sabines. One of the finest works of Giovanni da Bologna is the Rape of the Sabines, in which there is some very fine modeling in the figure of the Roman who is carrying off the girl. It is said that the artist designed this group to represent the three marked ages of man—youth, manhood, and old age; but a friend, seeing his wax model, found the attitudes so suggestive of the more classic subject, that Gian Bologna, acting on his advice, changed his design to the subject.

Raphael, Santi, born 1483, son of Gio Santi, a good painter. Perugino, Raphael's teacher, was characterized by "stainless purity of soul, by the highest aspirations, by feelings sad and enthusiastically tender." He studied the works of Leonardo da Vinci and Michael Angelo, and a new life pervaded his paintings. He made friends everywhere, and at his appearance, even among painters, ill-humor vanished. Vasari said, "Nature having been conquered by art through the hand of Michael Angelo, was in Raphael conquered by art and manners together." Raphael died on Good Friday, 1520. Pope Gregory XVI. had his grave opened 113 years after his death, and most impressive funeral services took place. His works were numerous and excited the wonder and admiration of all. His "Holy Family" and his "Madonnas" are well known.

Regulus, Marcus Atilius, a favorite hero with the Roman writers. He was chosen consul twice and sent against the Carthaginians in the first Punic War. For sometime he was victorious in every encounter, but at last suffered defeat. Regulus was taken prisoner and kept in captivity for five years. His embassy to Rome at the end of that time forms an interesting chapter in Roman history. Upon his return to Carthage, he was put to death.

Rossini, Gioacchino, an Italian composer; born 1792, died 1868. His parents were members of a strolling operatic company.

At ten years of age he played the second horn in the orchestra. He had a soprano voice of great purity and compass. In 1829 he produced *Guillaume Tell*, generally considered his master piece in serious composition. His operas number about forty. He also wrote cantatas, hymns, and miscellaneous vocal and instrumental pieces.

Rubens, Peter Paul, Flemish painter; born at Siegen, Germany, June 29, 1577; died in Antwerp, May 30, 1640. He was one of the most distinguished painters of his time. His Madonnas, Magdalens, and female saints are literally imitated from Flemish types of womanhood. As an animal painter he showed great excellence.

Saint Bruno, the founder of the Carthusian order of monks, was born at Cologne, 1051. He was troubled by the wickedness of the time and took refuge with six pious friends in a desert place near Chartreuse. Here he founded the most ancient of all orders. Each of the monks had a separate cell, only being allowed to see each other Sundays.

Saint Cecilia, the patroness of music, is said to have suffered martyrdom in 230 A. D. Her heathen parents belonged to a noble Roman family, and betrothed their daughter, who had become a Christian, to a heathen. This youth and his brother also were converted and suffered martyrdom. St. Cecilia, when commanded to sacrifice to idols, refused and was condemned to death. She is said to have invented the organ.

Saint Francis of Assisi, founder of the Franciscan order, and a saint of the R. C. Church, was one of the most extraordinary men of his age; born 1182. During an illness, contracted while a prisoner of war, his thoughts were turned from earth and he resolved to fulfill the counsels of the gospel. Two of his fellow-townsmen were his first associates, followed very slowly by others until in 1219, when he held his first general assembly; 5,000 people were present. He died 1226.

St. Jerome, one of the four great doctors of the Latin Church. Born about 340, died in Bethlehem September 30, 420.

Satyr, see Faun.

Schiller, Johann Christoph Friedrich von, great German poet; born 1759, died 1805. Schiller was first destined for the church, and next for the law, but he chose medicine, and in 1786 became a surgeon in the army. At an early age he composed poems and dramas. He left his profession and devoted himself to writing for the stage. He soon produced dramas and other literary productions of extraordinary merit. In 1799 he was appointed professor of history at Jena, and in 1791 finished his *History of the Thirty Years' War*. He was a warm friend of Goethe. His first drama was *Die Räuber*, his last *Wilhelm Tell*.

Schubert, Franz, German composer; born 1797, died 1828. Schubert raised the German *Lied* to a place in musical art which it had not previously occupied. His fame is wholly posthumous, and has constantly gained strength since his death. He left an astonishing number of compositions, including nine symphonies, several operas, masses, overtures, a great deal of chamber and pianoforte music, and about 600 songs.

Schumann, Robert, German musical composer; born 1810, died 1856. Up to the age of 18 his musical education was to a great extent self-directed. He then attended the University of Leipzig. Up to 1840 nearly all his compositions had been for the piano. Between 1840 and 1854 he produced those great works upon which his fame chiefly rests, his symphonies, his quintet opus 44 and quartet opus 47, "Paradise and the Peri," "The Pilgrimage of the Rose," and many other works of large scope.

Scott, Sir Walter, Scottish novelist and poet; born 1771, died 1832. From his earliest childhood onward, he was a ravenous

and insatiable reader; his memory was of extraordinary range and tenacity. A perfect stream of novels and poems flowed from his pen. The *Waverley Novels*, and his *Napoleon*, are known to most readers; and of his poems, *The Lay of the Last Minstrel*, and the *Lady of the Lake*, are known to our youth.

Seneca, Lucius Annaeus, a Roman stoic philosopher; born a few years before the Christian era, died in Rome, A. D. 65. The character and works of Seneca have been the subject of much controversy. He was no believer in the superstitions of his country, and has been called an atheist, but his religion seems to have been a pure deism. His works were chiefly on moral and philosophical subjects. He was also the author of ten tragedies. His language is clear and forcible. He was put to death by Nero.

Shakespeare, William, was born in April, 1564. He attended the Free Grammar School of Stratford, until, in consequence of his father's difficulties, he was withdrawn from school, and set to earn a living in some way for himself. What his precise employment was, is a question which affords room for much guessing, but one which cannot be answered with certainty. At 18 he was married to Anne Hathaway. She was 8 years older than her boy husband. For a number of years we hear nothing of him, until he is spoken of in 1592 as a successful actor and author. The "Queen's Players" came to Stratford in 1587. Then perhaps it was that Shakespeare decided to leave his native town, and seek his fortune in the world of London. In 1593 he was rapidly producing his historical plays and earlier comedies. In 1602 he finished his *Hamlet*, and in 1604 his *King Lear*. He died in 1616. By the voice of the whole civilized world his name is "the first in all literature;" in imagination, in fancy, in knowledge of man, in wisdom, in wit, in humor, in pathos, in strength, in versatility, in felicity of language, in the music of his verse, and in that mysterious power which fuses all these separate powers into one, and makes them a single means to a single end, he stands unapproached and seemingly unapproachable.

Sheridan, Philip Henry, greatly distinguished himself during the Civil war. Sheridan's raid, May 8-25, in 1864, is among the brilliant points of the war, whose close it greatly hastened, and Sheridan's ride before the battle of Winchester has taken its place in history and invaded the domain of poetry. He was born in Ohio, 1831; died 1887.

Silenus and the Infant Bacchus, Louvre, Paris. This group was found at Rome during the sixteenth century. We have here Silenus, the satyr who brought up and watched over the infant Bacchus, leaning against a tree and holding his young charge in both arms. There is a strong affection between the two, as the grim smile in the older face and the merry, hearty laugh of the younger would seem to indicate.

Slave, by Michel Angelo. This dying slave is one of the finest statues of the great master, and is found in the Louvre at Paris. The figure shows a noble treatment of the human form that scarcely found its equal since the antique. The head shows an expression of pain, that indicates deep-seated sufferings of the soul.

Socrates, the celebrated Athenian philosopher, was born in Athens, B. C. 469. In youth he was a sculptor. Being possessed of a good constitution, he was able to bear extraordinary fatigue and hardship. His ugly physiognomy excited the jests both of his friends and enemies. He early displayed great moral courage. The middle and latter part of his life was devoted to the self imposed task of teaching to the exclusion of all other business, public or private, and to the neglect of all means of

Venus of Capua, so-called because found among the ruins of the Amphitheatre.

Venus of Cnidus, by Praxiteles, was the most important work of that master; and the people of Cnidus were so proud of it that they engraved her image on their coins.

Venus, Crouching, Vatican, Rome. Found 1775 near Tivoli. Supposed to be by Daedalus. It is mentioned by Pliny as standing in the porch of Octavia in the temple of Jupiter at Rome.

Venus de Medici, marble in Florence. This statue is a copy of the original which stands in the tribunal of the Uffizi, Florence. It was discovered in the fifteenth century and brought to Rome during the reign of Cosimo de Medici. It was executed by Cleomenes of Athens, though probably chiseled in Rome. The goddess of love is probably the personification of the creative and generative forces of nature.

Venus de Milo, Louvre, Paris. This statue is justly regarded as the purest and noblest of all the existing marble statues representing the goddess of love. It was found in 1820, on the island of Melos, and is now in the Louvre at Paris. It is supposed to represent the Aphrodite Urania, or the heavenly Venus, to distinguish it from the vulgar goddess of the same name. As the statue was in a mutilated condition when found, various attempts have been made to restore it so as to express the motive of the statue, but none have received general acceptance and it is still a riddle which defies the ingenuity of those who attempt to solve it.

Venus Genetrix, of the Villa Borghese, at Rome, now in the Louvre. A wonderfully graceful figure of the late Roman period.

Venus Kallipygos, marble in the Naples Museum, so-called from the Greek definition of its peculiar character. It was once in the Farnese Palace, Rome. The back of the figure is particularly admired.

Venus in Shell. This Venus is probably the Aphrodite Pontia (of the sea), the tutelary deity of the ships and mariners, who controlled the wind and the waves, and granted to ships a fair and prosperous passage. Aphrodite was born of the foam of the sea, and first touched land on the island of Cyprus, which was henceforth held sacred to her.

Venus Victrix, by Thorwaldsen. In this beautiful statue the sculptor has embodied grace, symmetry and purity of style. The wonderful conception of Thorwaldsen was full of classic beauty, so that he has sometimes been called "the posthumous Greek."

Verdi, Giuseppe, Italian musical composer; born 1814. Verdi commenced the study of operatic music at the age of 19, and his first efforts at composition of operas was a failure. In 1842, however, his *Nabucco* established his fame. In this work he developed those characteristics of brilliant melody and vivid musico-dramatic effects which have maintained his public popularity to the present time. His other most popular operas are *Ercani*, *Macbeth*, *Rigoletto*, *Don Carlos*, *Aida* and *Il Trovatore*.

Verus, Lucius, was the unworthy son-in-law of the "good Aurelius," and was Emperor from 161 to 169 A. D. He is represented as having been exceedingly wasteful and profligate. Soon after his accession, Marcus Aurelius dispatched him to the East, and for four years carried on war with great success against the King of Parthia. He subsequently prosecuted the war with the Barbarians living along the northern limits of the empire, from the sources of the Danube to the Illyrian border.

Victory, by Rauch. This is a copy of the statue of Victory at Berlin, Germany, which commemorates the victory of 1871,

and the union of Germany. Christian Rauch, an eminent sculptor, was born at Waldeck, 1777, and died 1857. He executed six marble "Victories" for the Walhalla, and many marble busts of great excellence. His statues are some of the finest productions of modern sculpture and of classic beauty.

Vitellius was an emperor of Rome. He was born A. D. 15. He was a glutton, and an epicure; his chief amusement was gambling. Galba gave Vitellius command of the legions in Lower Germany, and the soldiers proclaimed him emperor in A. D. 69. Vitellius was assassinated after a reign of a year.

Voltaire—Francis Marie Aronnet (his true name), one of the most famous of French writers; born 1694, and died 1778. His father desired him to study law, but he chose the career of a man of letters. He was sent to the Bastille for writing satirical verses reflecting on the government of Louis XIV. After his release he assumed the name of Voltaire. He was a shrewd financier, accumulating quite a fortune; his books were never a source of great profit to him, despite their immense popularity. The sum of his literary labors remains in something like ninety volumes. He was truly a universal genius; he wrote literally everything—histories, dramas, poems, disquisitions, literary, philosophical and scientific novels. His favorite weapon was ridicule. His prose is the perfection of French style.

Wagner, Richard, German musical composer; born 1813 died 1883. Wagner received his first systematic instruction while studying at the University of Leipzig. From 1836 to 1842 he wrote music in his own peculiar style, but was not appreciated, and it was, therefore, a struggle with poverty. From that time forward his ideas gradually gained ground, and by the aid and assistance of Liszt and other great musicians and influential personages, was able to carry out his grand idea of opening a theater at Baireuth, Bavaria, where his great operas could be properly brought out. His undertaking was crowned with success. His great works are *Faust*, *Rienzi*, *Tannhauser*, *Lohengrin*, and the series of operas founded on the *Nibelungendied*.

Washington, George, the Father of his Country, and first President of the United States; born 1732, died 1799. Early engaged in important commissions in the French and Indian War, he was later made commander-in-chief of the American forces during the Revolutionary War. The war was conducted by Washington under every possible disadvantage; he met with frequent reverses, but rose superior to such formidable obstacles, and was able, with unexhausted patience and matchless skill, to bring the contest eventually to an auspicious and honorable close. He was President from 1789 to 1797.

Weber, Karl Maria von, German musical composer; born 1786, died 1826. Weber's mind was sensitive and poetic, and hence his treatment of subjects in which the fanciful, legendary and supernatural elements predominate. His greatest works are *Der Freischütz* and *Oberon*.

Webster, Daniel, American statesman and orator; born 1782, died 1852. Graduating at Dartmouth in 1801, he commenced the study of law. Removing from Boston to Portsmouth he engaged in politics and was elected as a member of the Federalist party to Congress, where he immediately took rank among the foremost men of the country. Returning to Boston he again practiced law. He was elected to Congress as Representative in 1822, and as Senator in 1826. In 1839 he was Secretary of State in the Cabinet of General Harrison, and again in 1850 under Fillmore. He aspired to the Presidency at different times but never received the nomination. His senatorial efforts were directed to the preservation of the Union.

William, Frederick, king of Prussia, was born 1841. He succeeded to the throne of Prussia when only 19 years of age. He was married to the daughter of Queen Victoria in 1858. He had three sons and four daughters. He died after a reign of less than a year in 1888.

William II., present emperor of Germany was born in 1859. **William I.,** king of Prussia, died in 1871 emperor of Germany was born 1797. He joined the army at an early age and was distinguished in the campaigns of 1813 against France. On the accession of his elder brother to the throne William became

governor of Pomerania. In 1861 he ascended the throne and became the head of the North German Confederation in 1867. He died in 1888.

Wrestlers. In the Uffizi, Florence. It is ascribed to the artists of Rhodes, and is one of the great productions co-eval with the Laocœon and the Farnese Bull.

Zacharias, a Roman Pontiff, successor of Gregory III, in 741. He is noticeable as one of the series of Greek popes by whom the destinies of Rome and Italy were much influenced in the 7th and 8th centuries. He died at Rome, 752.

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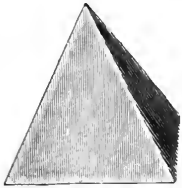
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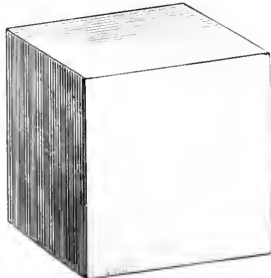
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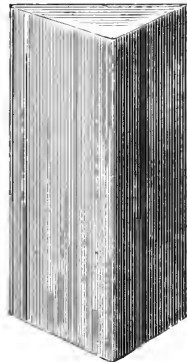
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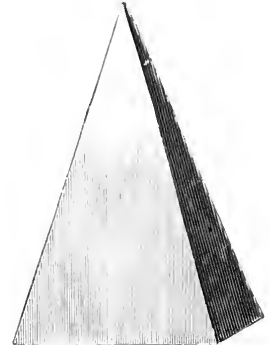
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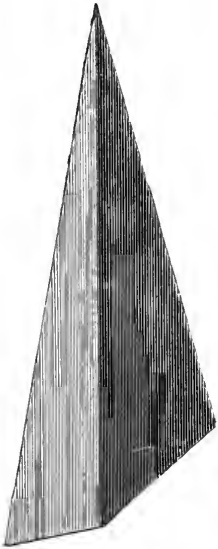
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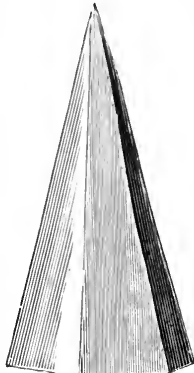
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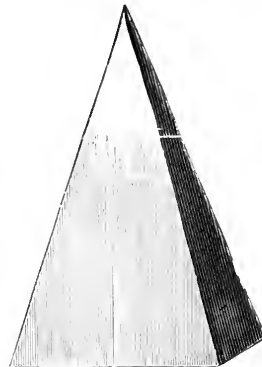
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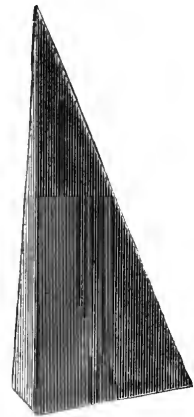
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" 3011—7½ x 4 in40c.

HEXAGONAL PYRAMID.



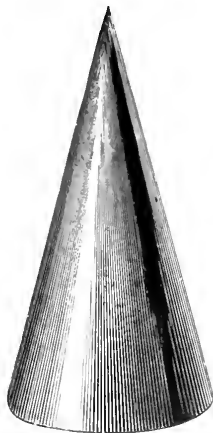
No. 3012—10 in.60c.
" 3013—7 x 3½40c.

TRIANGULAR PYRAMID.



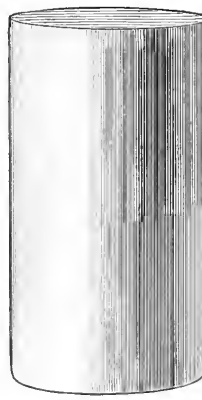
No. 3014—10 in.60c.
" 3015—7½ x 3½40c.

CONE.



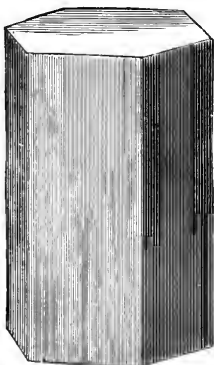
No. 3018—11 in60c.
" 3019—8 x 4 in.40c.

CYLINDER.



No. 3020—10 x 5½ in.60c.
" 3021—4 x 4 in.30c.

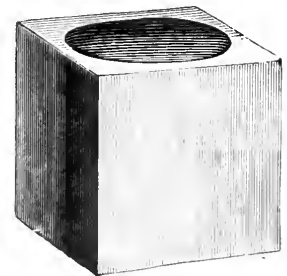
HEXAGONAL PRISM.



No. 3016—10 in60c.
" 3017—6½ x 4½ in40c.

CUBE,

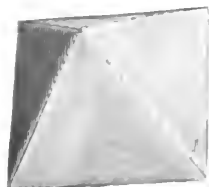
With Depression for Sphere.



No. 3022—7 x 7 in60c
" 3023—4 in.30c.

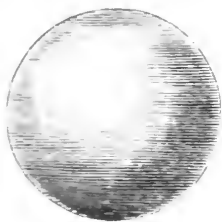
Many different designs can be made with these Solids by combinations.

OCTAHEDRON



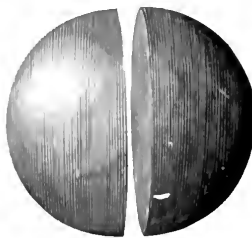
No. 3024—8 in.....60c.
" 3025—5½ in.....30c.

SPHERE.
With Hook to Suspend.



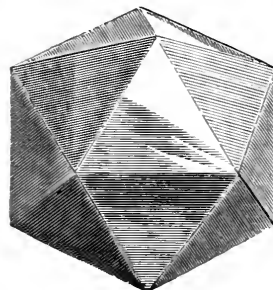
No. 3026—7 in.....60c.
" 3027—4 in.....30c.

DIVIDED SPHERE.



No. 3028—5 in.....60c.

ICOSAHEDRON.



No. 3029—7½ in.....60c.
" 3030—6 in.....40c.

DIVIDED HOLLOW CYLINDER.



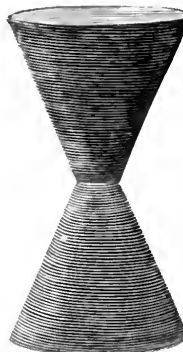
No. 3031—8 x 5 in.....60c.

SPOOL.



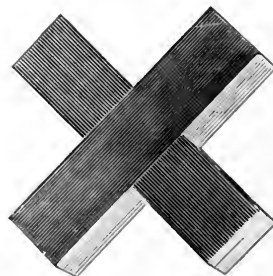
No. 3032—8 x 6 in.....60c.

DOUBLE FRUSTUM.



No. 3033—9 x 5 in.....60c.

CROSS.



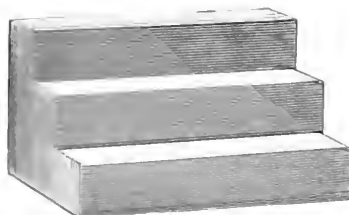
No. 3034—8 in.....60c.

WHEEL.



No. 3035—Diameter 12 in.....\$1.25

STAIRS.



No. 3036—8 in.....75c.

SCREW.



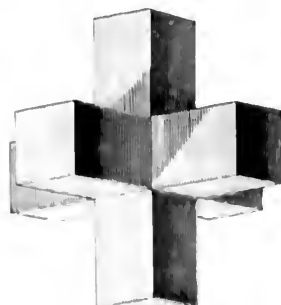
No. 3037—8 in.....60c.

BRACKET.



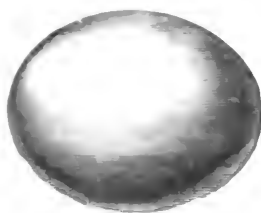
No. 3040—10 x 6 in.....75c.

DOUBLE CROSS.



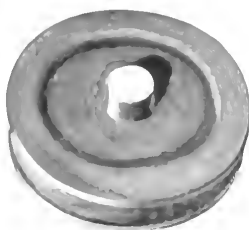
No. 3041—8 x 8 in.....80c.

OSTRICH EGG

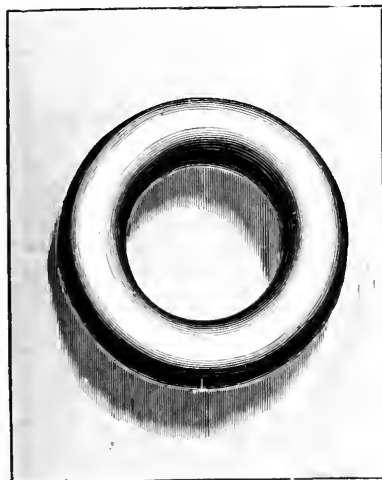


No. 3038—9½ in.....60c.

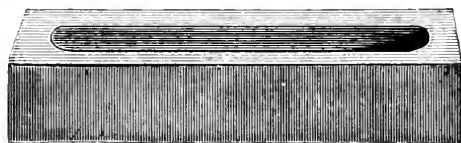
SHEAVE



No. 3039—10 in.....60c.

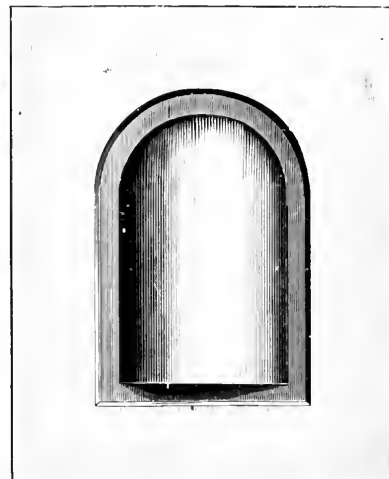


No. 3042—8 x 6½ in... 60c.

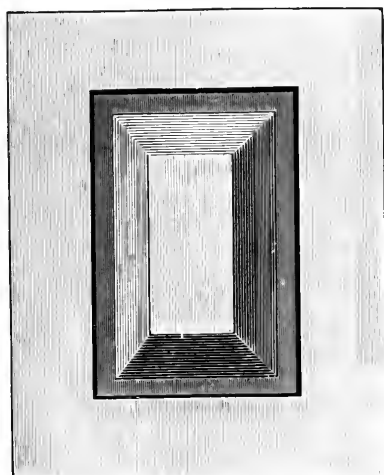


No. 3043—9½ x 3¾ in ... 50c.

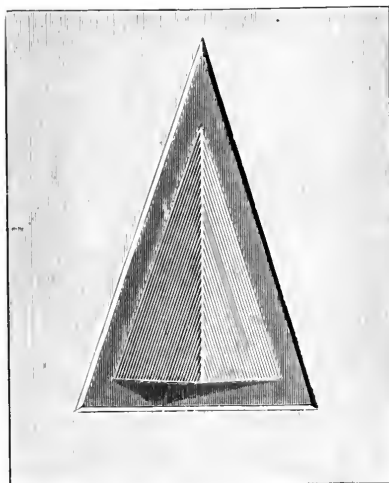
*Please do not cut this book
in making orders. No errors
will occur if you state the
number of articles wanted.*



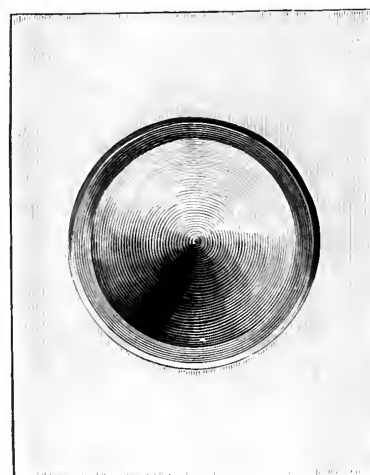
No. 3044—8 x 6½ in ... 40c.



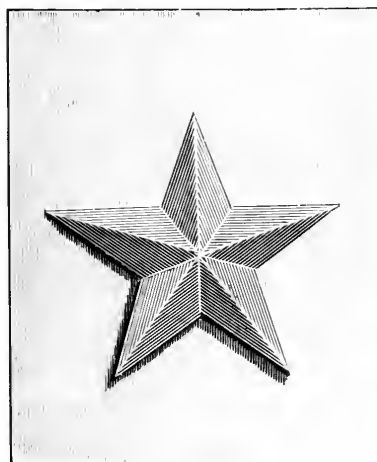
No. 3045—8 x 6½ in... 40c.



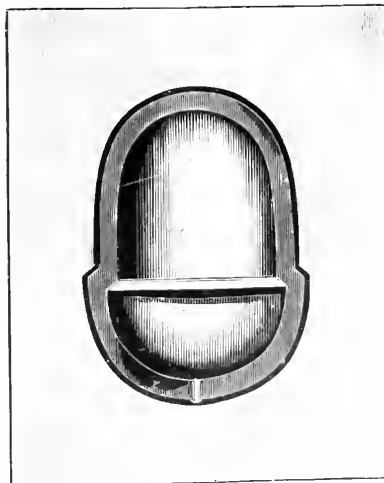
No. 3046—8 x 6½ in... 40c.



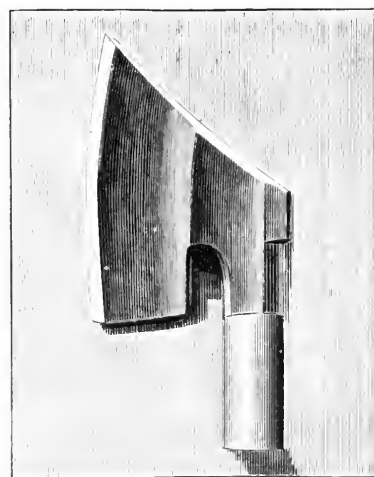
No. 3047—8½ x 6½ in... 40c.



No. 3048—8 x 6½ in... 50c.



No. 3049—8 x 6½ in... 60c.

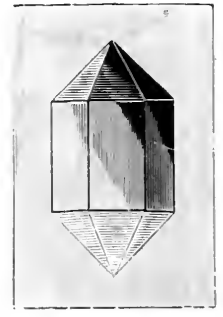
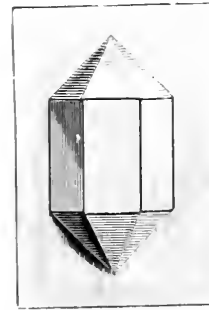


No. 3050—8 x 6½ in... 70c.

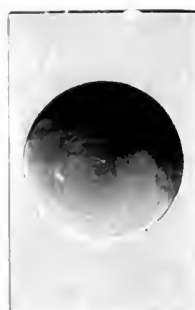
C. HENNECKE CO. MILWAUKEE AND CHICAGO



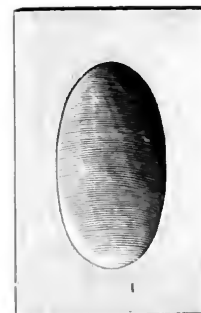
No. 3051— $7\frac{1}{2} \times 5$ in. per pair, 75c.



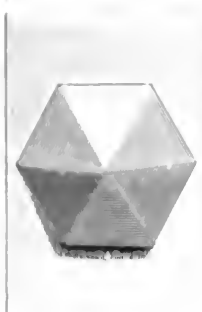
No. 3052— $7\frac{1}{2} \times 5$ in. per pair, 75c.



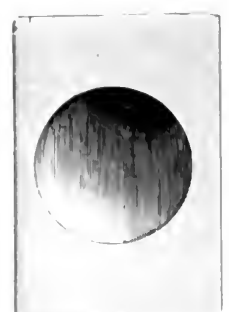
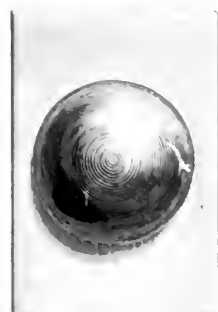
No. 3053— $7\frac{1}{2} \times 5$ in. per pair, 75c.



No. 3054— $7\frac{1}{2} \times 5$ in. per pair, 75c.

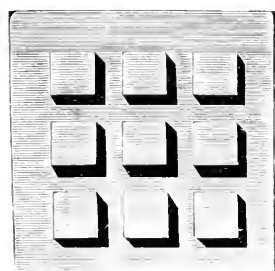


No. 3055— $7\frac{1}{2} \times 5$ in. per pair, 75c.

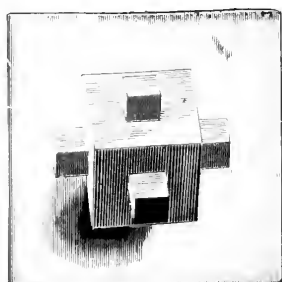


No. 3056— $7\frac{1}{2} \times 5$ in. per pair, 75c.

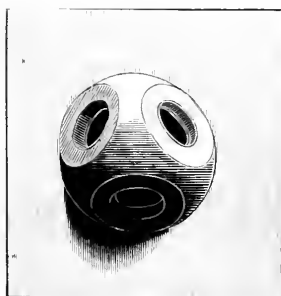
Each of the above stamps is shown in two views, the front and the back, showing the exact reverse of the reliefs, and the reverse of the reliefs.



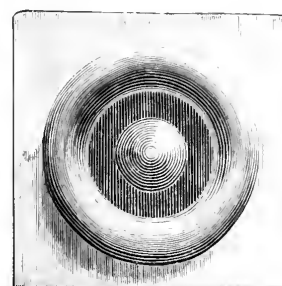
No. 3057—9 x 9 in ... 75c.



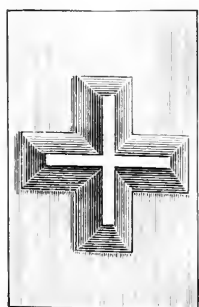
No. 3058—9 x 9 in ... 80c.



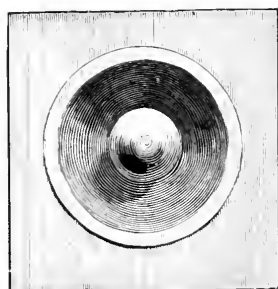
No. 3059—9 x 9 in ... 80c.



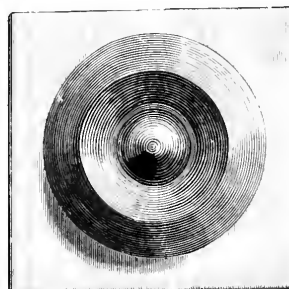
No. 3060—9 x 9 in ... 80c.



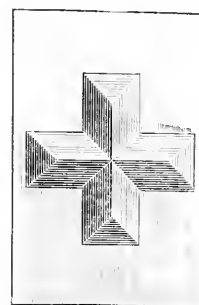
No. 3061—7½ x 5 in ... 50c.



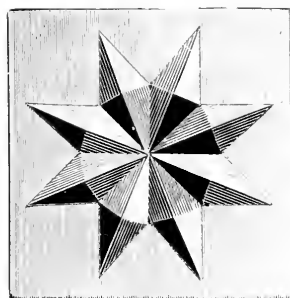
No. 3062—9 x 9 in ... 80c.



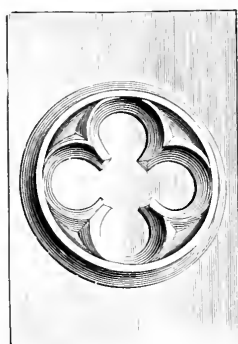
No. 3063—9½ x 9½ in ... 80c.



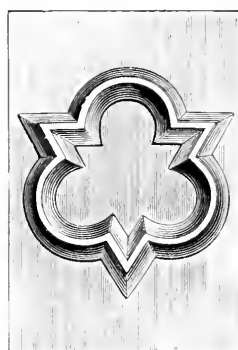
No. 3064—11 x 6 in ... 70c.



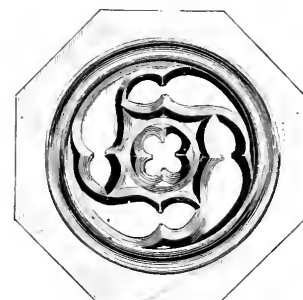
No. 3065—9 x 9 in ... 80c.



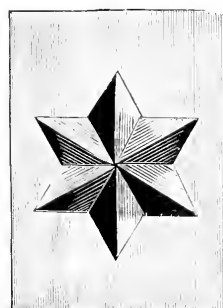
No. 3066—7½ x 5 in ... 50c.



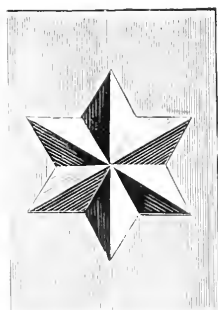
No. 3067—7½ x 5 in ... 50c.



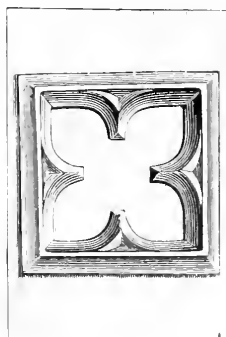
No. 3068—8 x 8 in ... 50c.



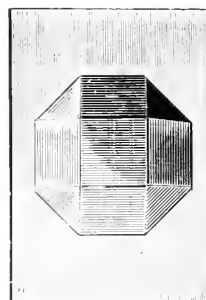
No. 3069—5 x 7½ in ... per pair, 75c.



No. 3070—7½ x 5 in ... 50c.



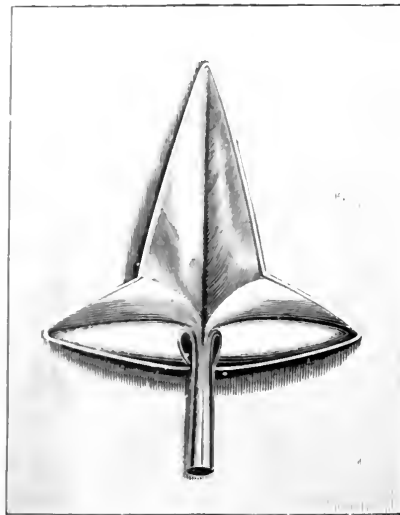
No. 3071—7½ x 5 in ... per pair, 75c.



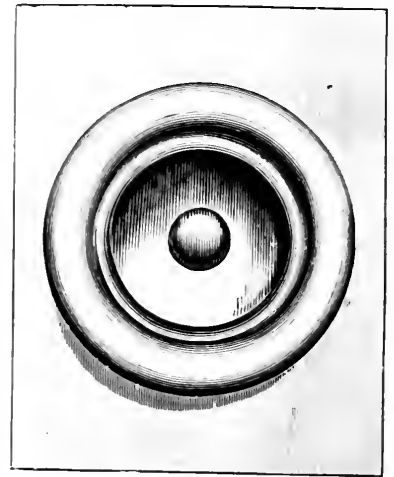
C. HENNECKE CO MILWAUKEE AND CHICAGO



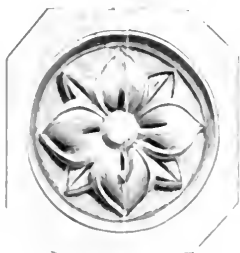
No. 3072—9½ x 7½ in. . . .75c



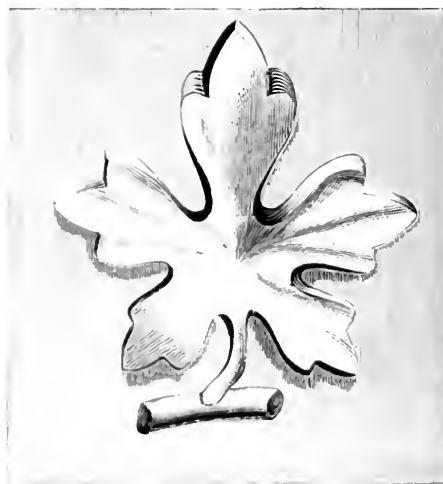
No. 3073—9½ x 7½ in. . . .80c.



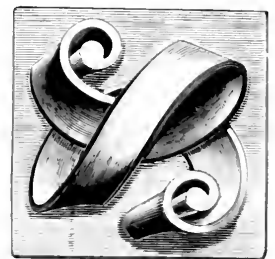
No. 3074—8 x 6½ in. . . .60c.



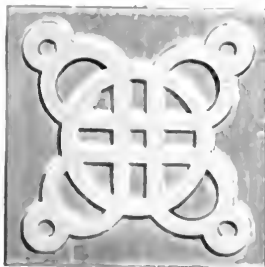
No. 3075—8 x 8 in. . . .50c



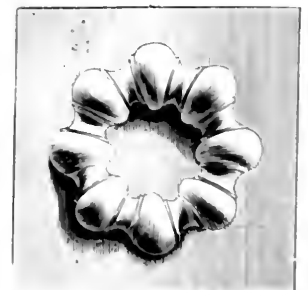
No. 3076—8 x 7 in. . . .75c



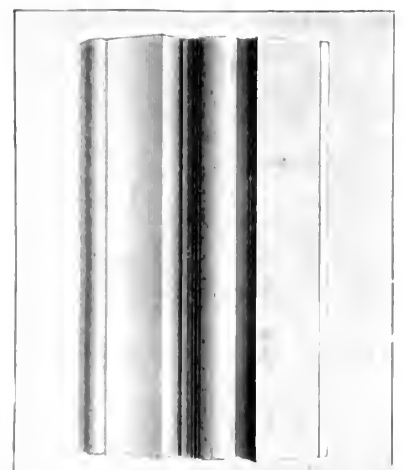
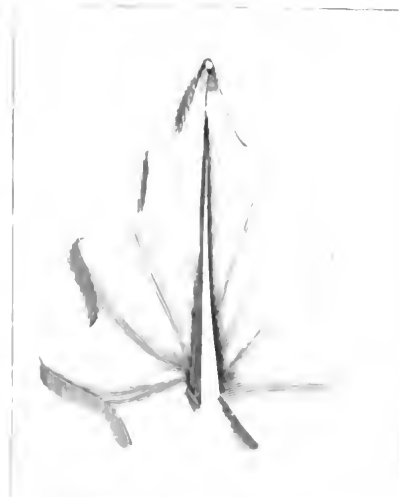
No. 3077—8½ x 8½ . . .60c.



No. 3078—8½ x 8½ in. . . .60c

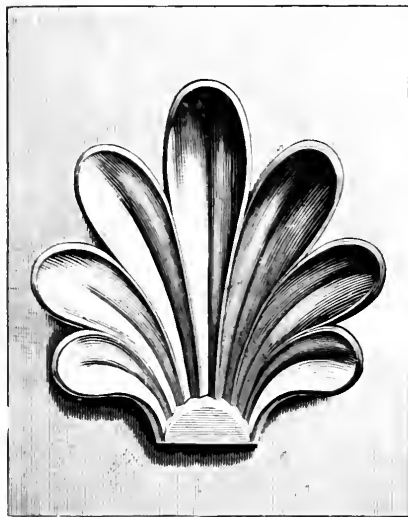


No. 3079—9 x 9 in. . . .75c.

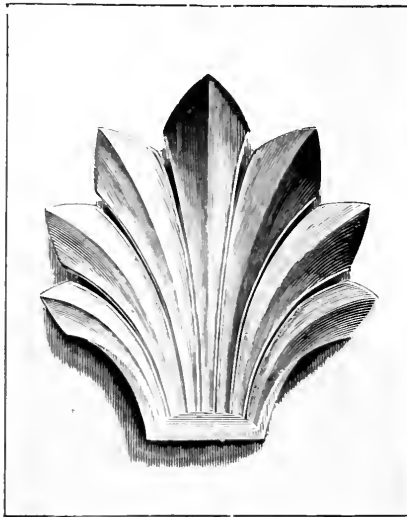


CLASSICAL STATUARY. BUSTS AND MODELS

7



No. 3083— $9\frac{1}{2} \times 7\frac{1}{2}$ in.60c.



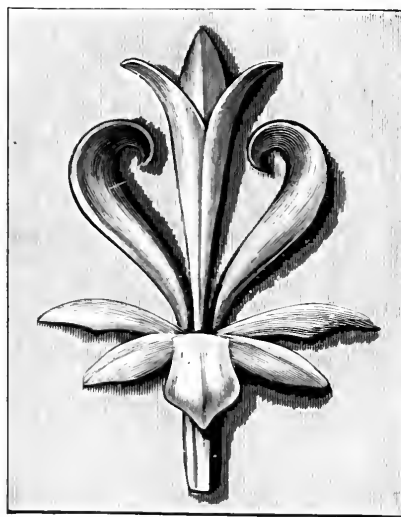
No. 3084— $9\frac{1}{2} \times 7\frac{1}{2}$ in.60c.



No. 3085— $9\frac{1}{2} \times 7\frac{1}{2}$ in.60c.



No. 3086— $9\frac{1}{2} \times 7\frac{1}{2}$ in.60c.



No. 3087— $9\frac{1}{2} \times 7\frac{1}{2}$ in.80c.



No. 3088— $12 \times 8\frac{1}{2}$ in. \$1.00



No. 3089— 12×8 in.80c.



No. 3090— $9\frac{1}{2} \times 7\frac{1}{2}$ in.80c.

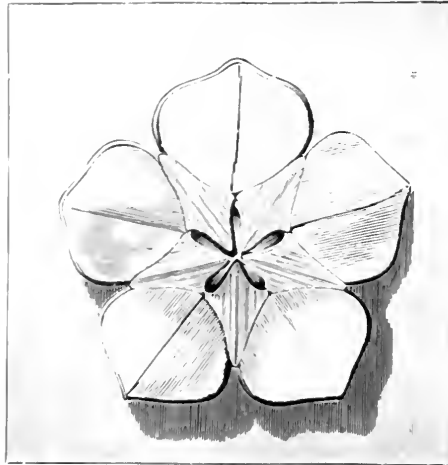


No. 3091— $12 \times 8\frac{1}{2}$ in.75c

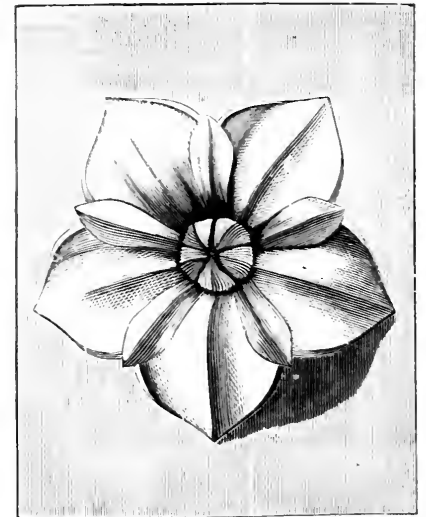
C. HENNECKE CO MILWAUKEE AND CHICAGO



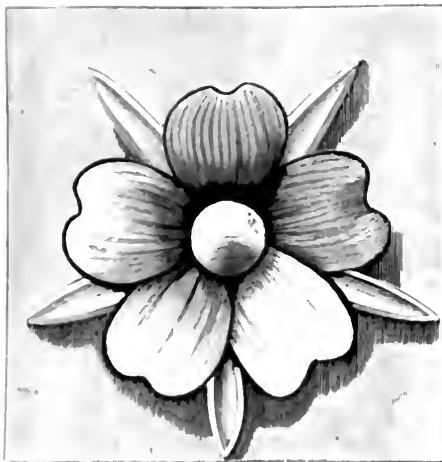
No. 3092—9½ x 7½ in 90c



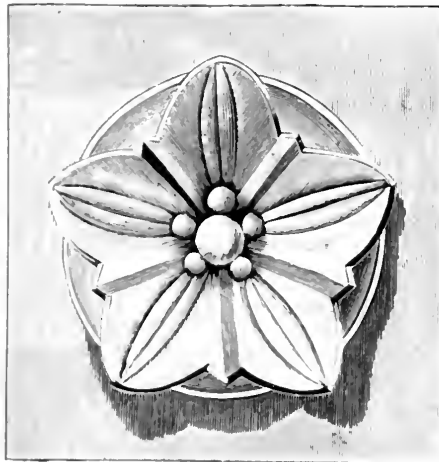
No. 3093—9½ x 9½ in \$1.00



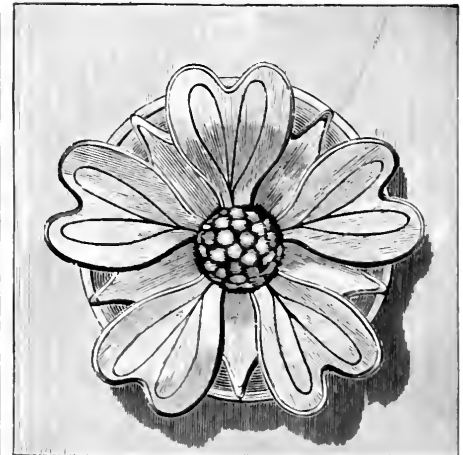
No. 3094—9½ x 7½ in 90c



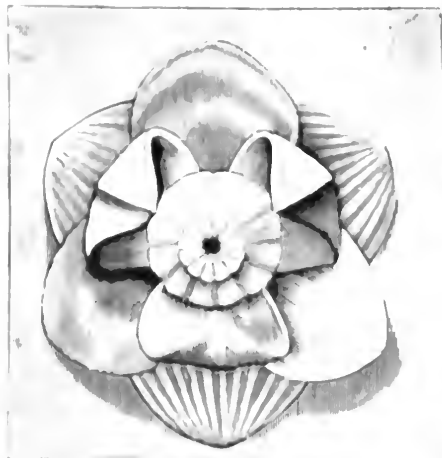
No. 3095—9 x 9 in 90c



No. 3096—9 x 9 in 75c



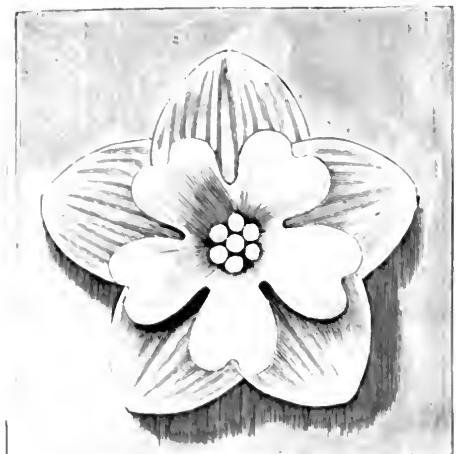
No. 3097—9 x 9 in 75c



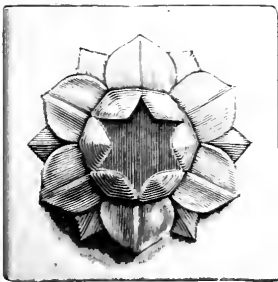
No. 3098—9 x 9 in 90c



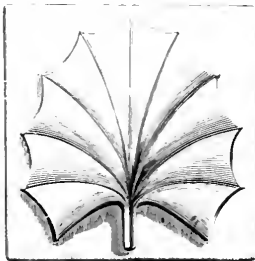
No. 3099—9 x 9 in \$.50



No. 3100—9 x 9 in 90c



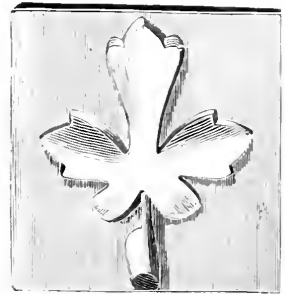
No. 3101—9 x 9 in . . . 80c.



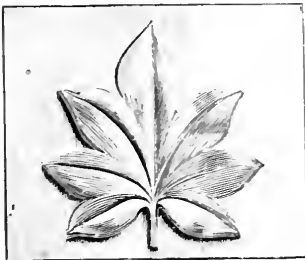
No. 3102—8 x 8 in . . . 60c.



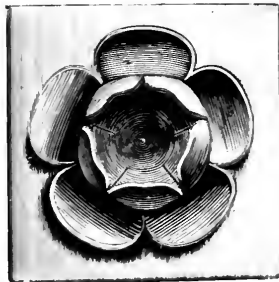
No. 3103—5½ x 9 in . . . 60c.



No. 3104—7 x 7 in . . . 40c.



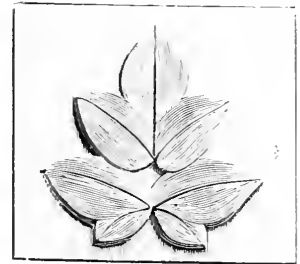
No. 3105—9½ x 8 in . . . 60c.



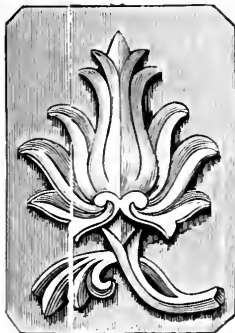
No. 3106—9 x 9 in . . . 75c.



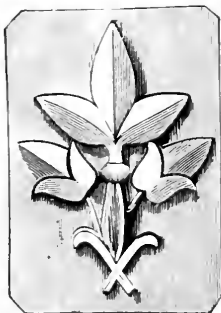
No. 3107—9 x 8 in . . . 60c.



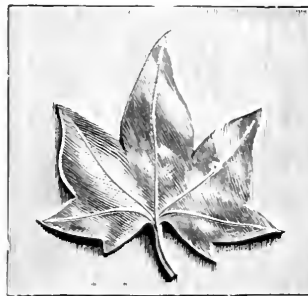
No. 3108—9 x 8 in . . . 60c.



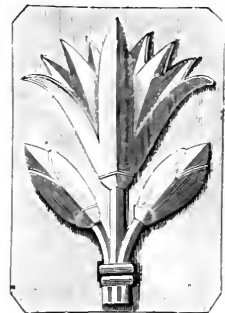
No. 3109—11 x 8 in . . . 50c.



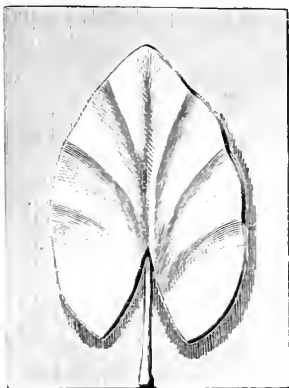
No. 3110—10½ x 7½ in . . . 60c.



No. 3111—10½ x 9 in . . . 75c.



No. 3112—10½ x 7½ in . . . 60c.



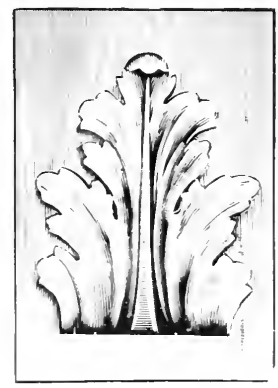
No. 3113—10 x 7½ in . . . 60c.



No. 3114—10 x 7 in . . . 50c.



No. 3115—7½ x 6½ in . . . 50c.



No. 3116—8 x 12 in . . . 75c.

C. HENNECKE CO. MILWAUKEE and CHICAGO.

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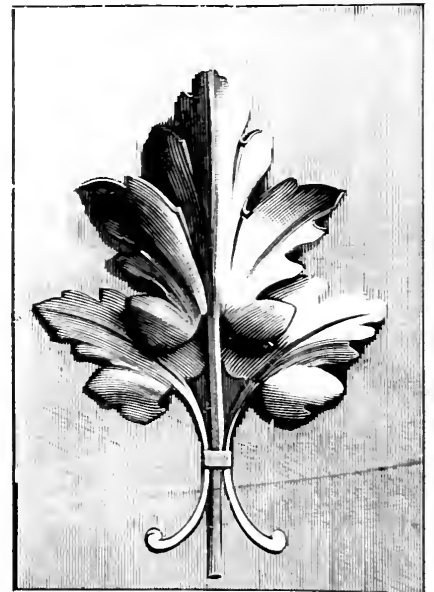
All Plaques have Hooks to suspend.



No. 3117—17½ x 10½ in. . . \$1.25



No. 3118—9 x 11½ in. . . 90c.



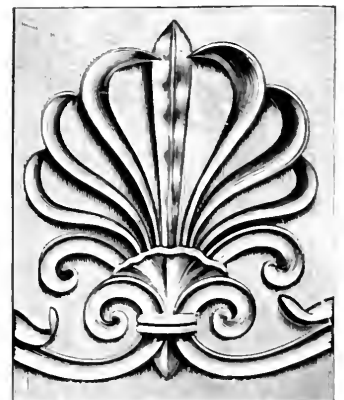
No. 3119—8½ x 12 in. . . \$1.00



No. 3120—9 x 9 in. . . 75c.



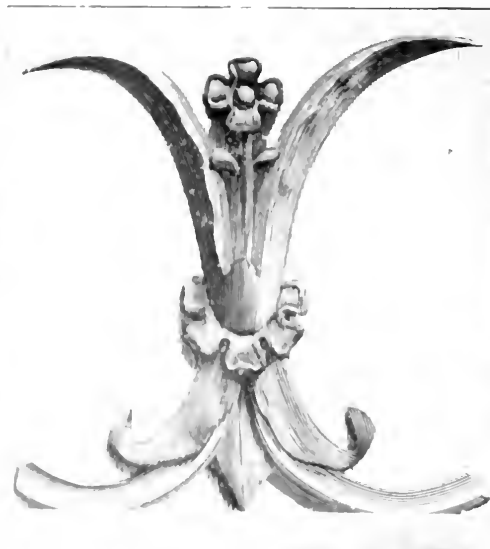
No. 3121—8½ x 12 in. . . \$1.25



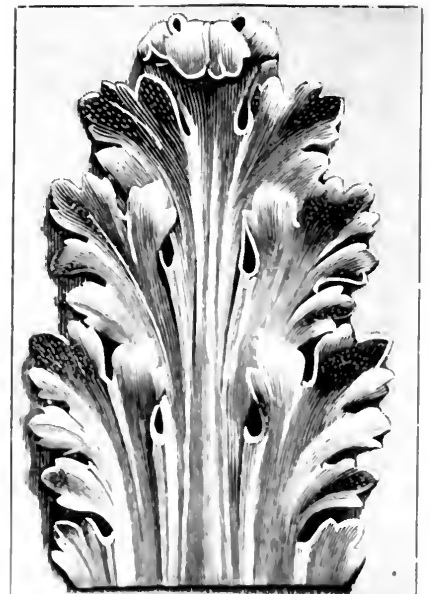
No. 3122—13½ x 17 in. . . \$2.00



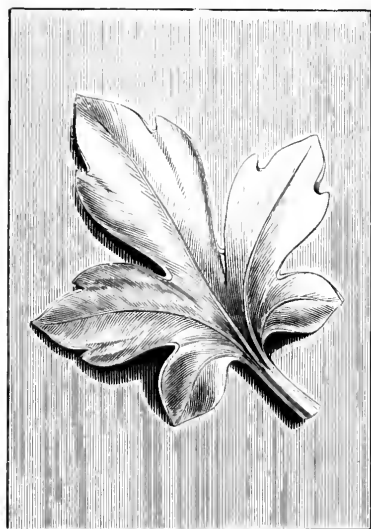
No. 3123—17½ x 10½ in. . . \$1.25



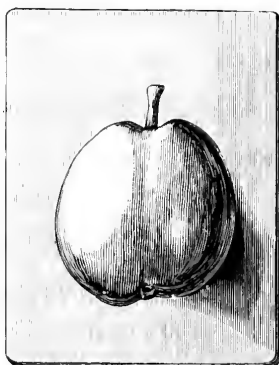
No. 3124—17½ x 10½ in. . . \$1.25



No. 3125—17½ x 10½ in. . . \$1.25

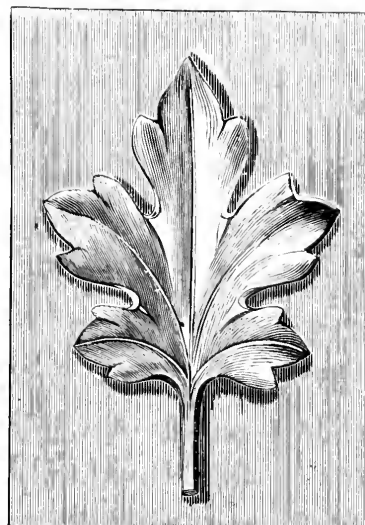


No. 3126—12 x 8½ in. . . .75c.



Size of Plaque, 7 x 5½ in.

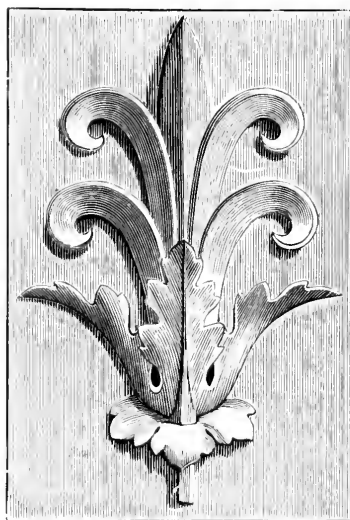
No. 3127—Pear.....	price, 50c.
" 3128—Orange	" 50c.
" 3129— "	" 50c.
" 3130—Lemon	" 50c.
" 3131—Citron	" 50c.
" 3132—Quince.....	" 50c.
" 3133—Pomegranate.....	" 50c.
" 3134—Apple.....	" 50c.
" 3135—Potato.....	" 50c.
" 3136—Cocoanut.....	" 50c.



No. 3137—12 x 8½ in. . . .75c.



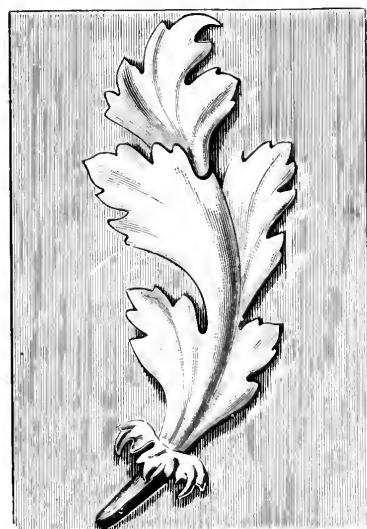
No. 3138—8½ x 10½ in. . . .90c.



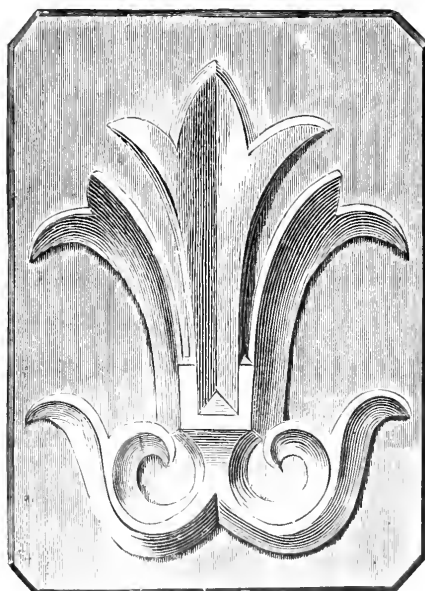
No. 3139—12 x 8 in. . . .90c.



No. 3140—8 x 12½ in. . . . \$1.20



No. 3141—12 x 8½ in. . . .80c.



No. 3142—10½ x 7½ in. . . .90c.



No. 3143—12 x 8½ in. . . . \$1.00

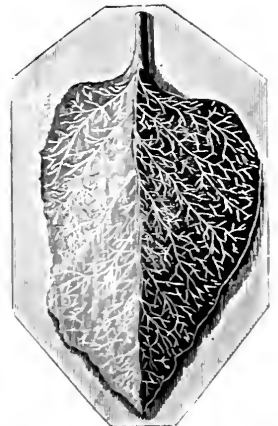
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No. 3111—12 x 9 in. ... \$1.00



No. 3145—11 1/2 x 9 1/2 in. ... \$1.00



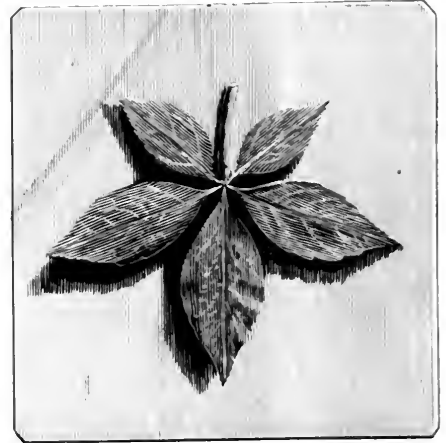
No. 3146—9 x 6 in. ... 60c.



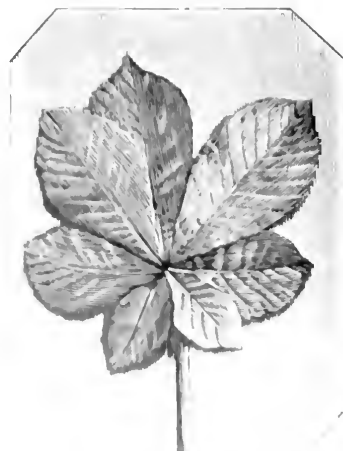
No. 3147—10 x 8 in. ... 75c



No. 3118—14 x 14 in. ... \$1.50



No. 3149—14 x 14 in. ... \$1.50



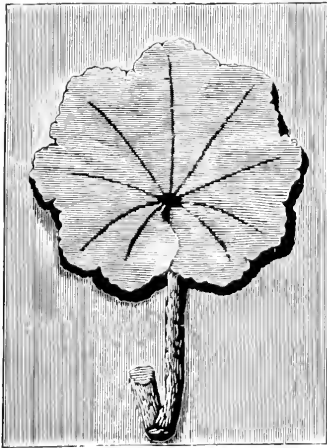
No. 3152—16 1/2 x 11 in. ... \$1.25

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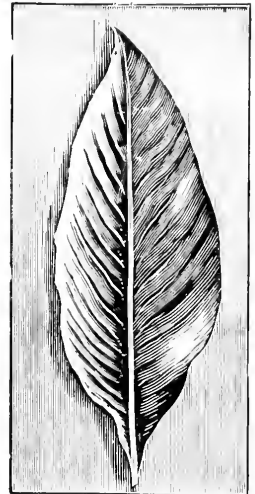
All Plaques have Hooks to suspend.



No. 3153—9½ x 7½ in. . . .60c.



No. 3154—10 x 13 in. . . \$1.25



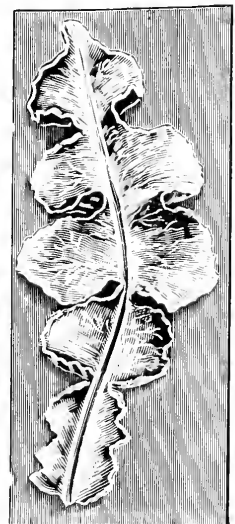
No. 3155—7½ x 15½ in. . . \$1.25



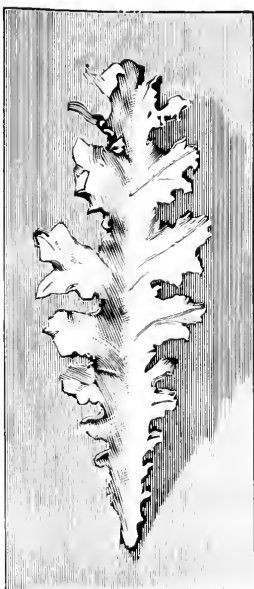
No. 3156—9 x 17½ in. . . \$1.30



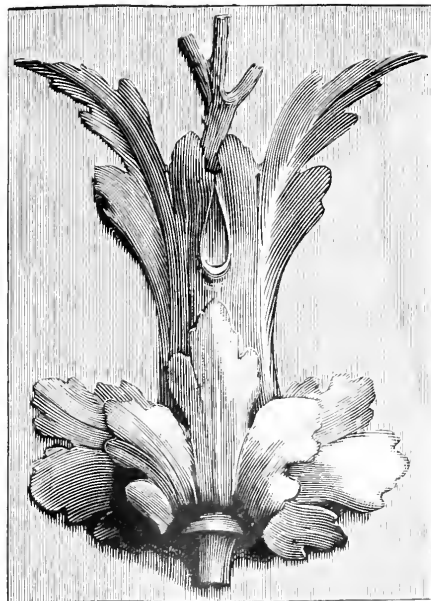
No. 3157—22 x 23 in. . . \$3.00



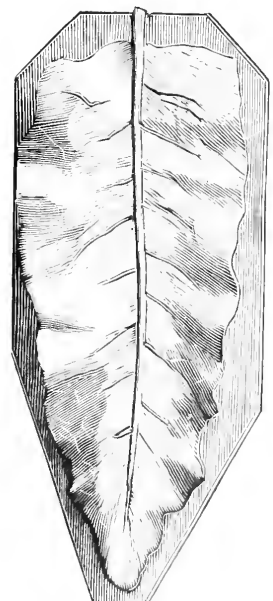
No. 3158—8½ x 20½ in. . . \$1.30



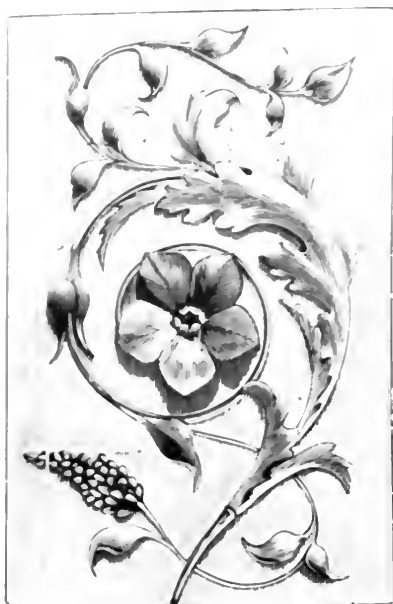
No. 3159—8 x 19 in. . . \$1.30



No. 3160—14½ x 19½ in. . . \$2.25



No. 3161—5½ x 13 in. . . \$1.25



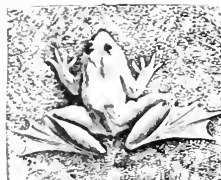
No. 3162—17½ x 10½ in. ...\$1.25



No. 3166—5¼ x 4½ in. ...19c



No. 3163—5 x 3¼ in. ...25c



No. 3164—5 x 4½ in. ...35c



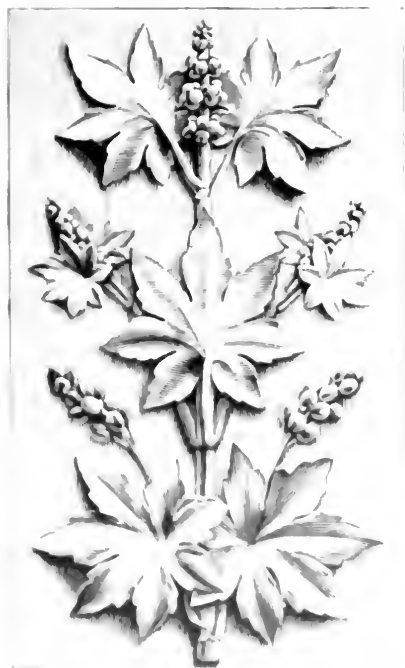
No. 3167—13 x 18 in. ...\$1.75



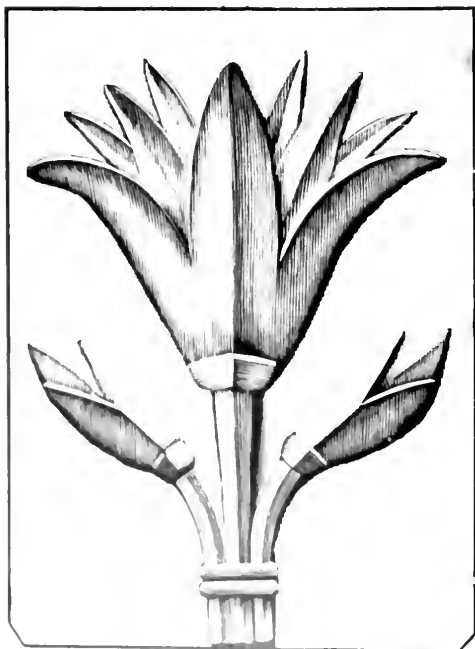
No. 3165—15 x 10 in. ...\$1.25



No. 3168—7½ x 5 in. ...60c



No. 3169—12 x 10 in. ...\$1.00



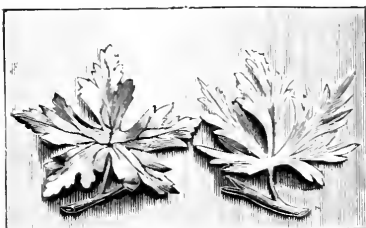
No. 3170—8 x 11 in. ...\$1.00



No. 3171—22 x 13 in. ...\$2.50



No. 3172—9½ x 16½ in. . . . \$1.30



No. 3173—11½ x 7 in . . . 90c.



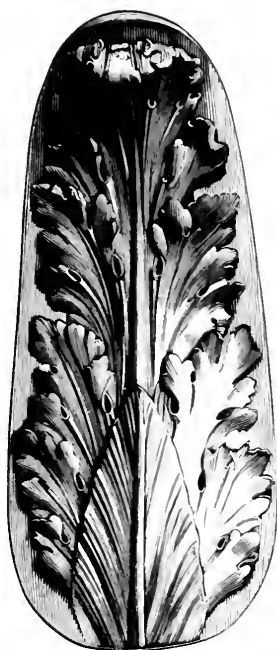
No. 3175—14 x 16 in . . . \$1.75



No. 3174—9½ x 16½ in. . . . \$1.30

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No. 3176—10 x 23 in. . . . \$1.75



No. 3177—18 x 20 in. . . . \$3.00



No. 3178—9 x 24 in. . . . \$2.25



No. 3179—8½ x 13 in. . . 90c



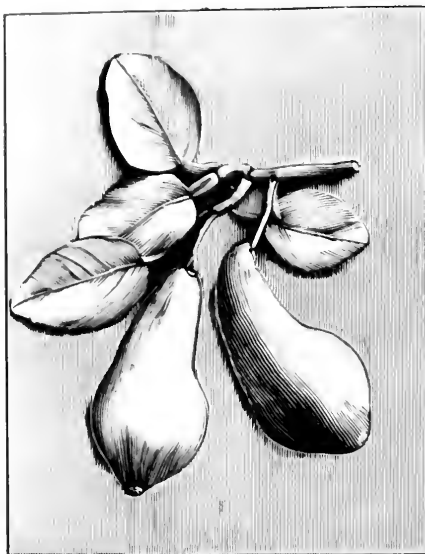
No. 3180—9½ x 12 in. . . \$1.00



No. 3181—17 x 11 in. . . \$1.25



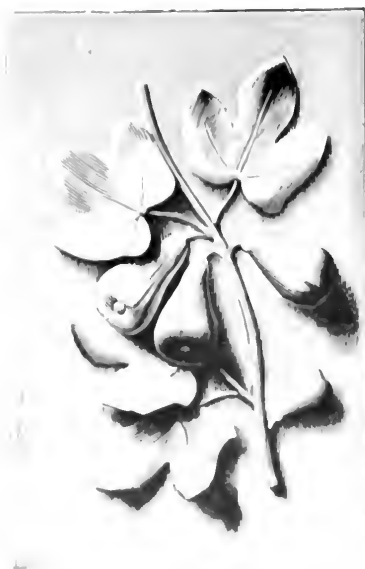
No. 3182—9 x 11½ in. . . \$1.00



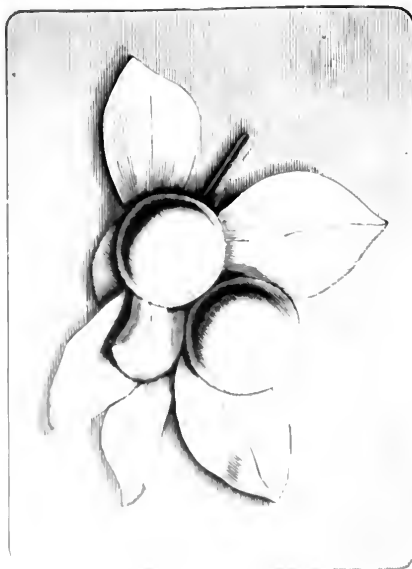
No. 3183—9 x 11½ in. . . \$1.00



No. 3184—8½ x 11 in. . . \$1.00



No. 3185—11 x 13 in. . . \$1.00



No. 3186—11 x 13 in. . . \$1.00

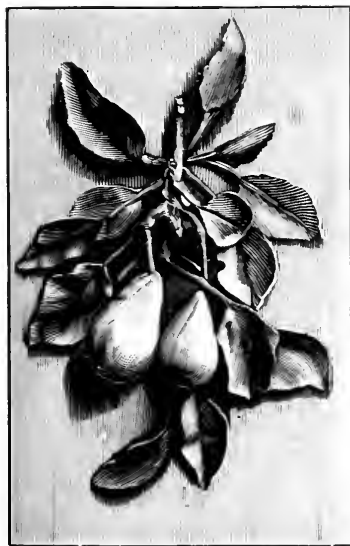


No. 3187—18½ x 10 in. . . \$1.25

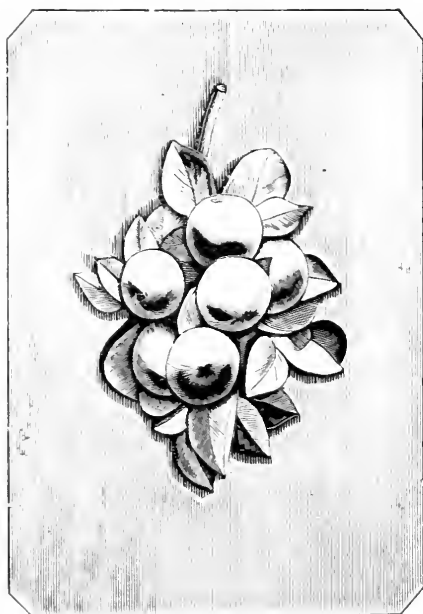
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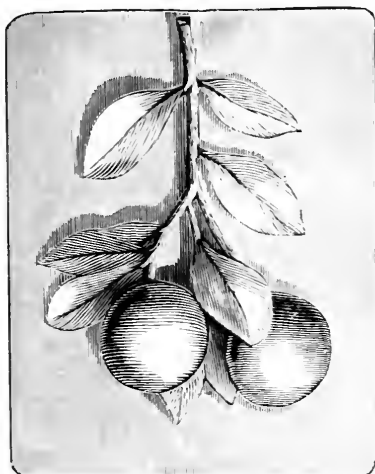
No. 3188—14 x 10 in....\$1.25



No. 3189—14½ x 10 in....\$1.00



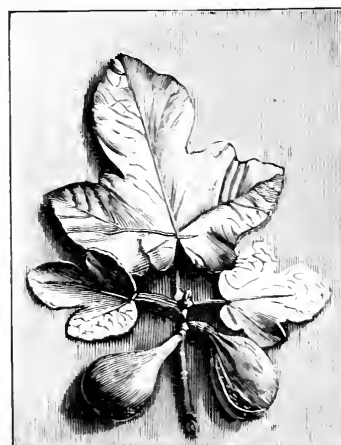
No. 3190—17½ x 11 in .. \$1.25



No. 3191—12 x 10 in....\$1.00



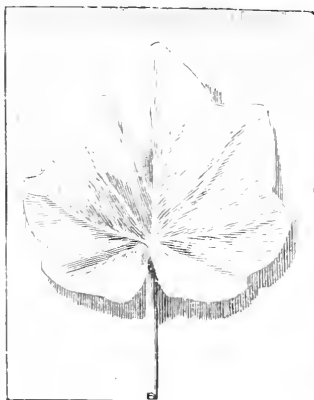
No. 3192—15 x 14 in... \$1.50



No. 3193—11½ x 9 in ...\$1.00



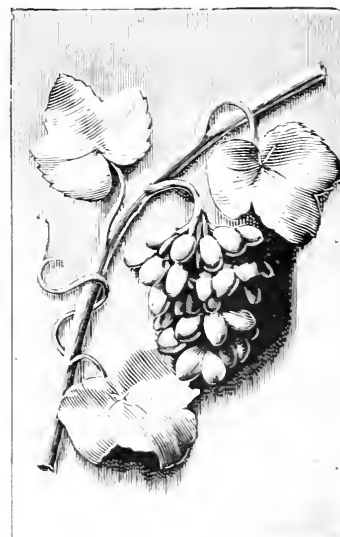
No. 3194—17½ x 11 in....\$1.50



No. 3195—10 x 8 in....75c.



No. 3196—10½ x 7 in ...75c.



No. 3197—17½ x 11 in \$1.25

Casts, as far as possible, are named and classified in Index.

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to suspend.



No. 3198—10½ x 9 in... \$1.00



No. 3199—9½ x 9½ in... 75c.



No. 3200—10½ x 9 in... \$1.00



No. 3201—11 x 9 in... \$1.00



No. 3202—10½ in... \$1.00



No. 3203—11 x 9 in... \$1.00



No. 3204—11 x 11 in... \$1.00

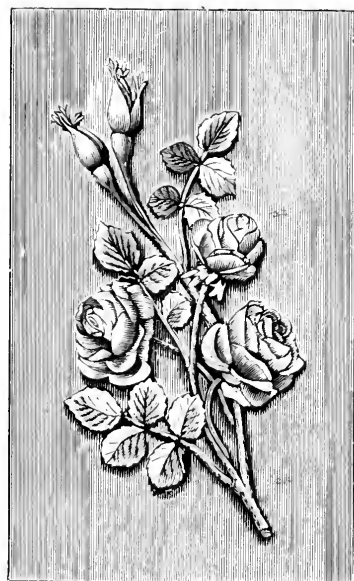


No. 3206—17½ x 11 in... \$1.25

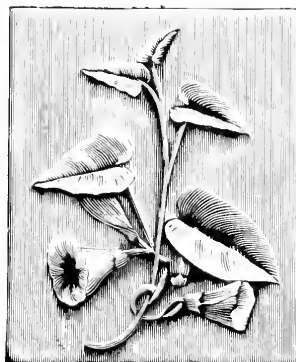
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No. 3207—17½ x 11 in... \$1.25



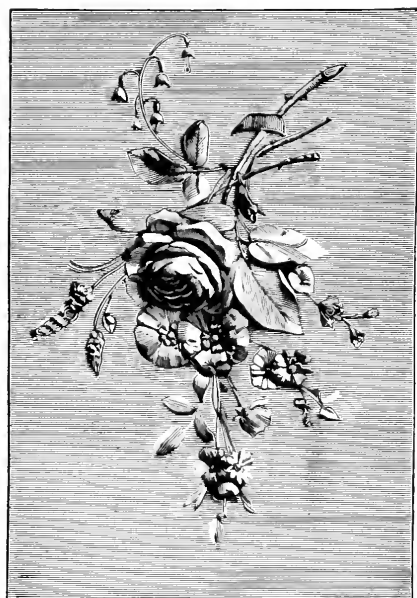
No. 3208—12 x 8 in... \$1.00



No. 3209—18 x 11½ in... \$1.25



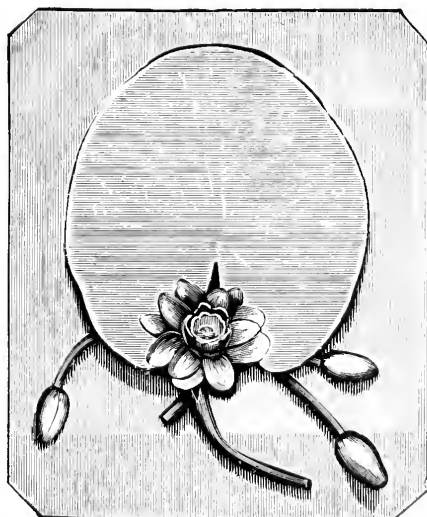
No. 3210—17½ x 11 in... \$1.25



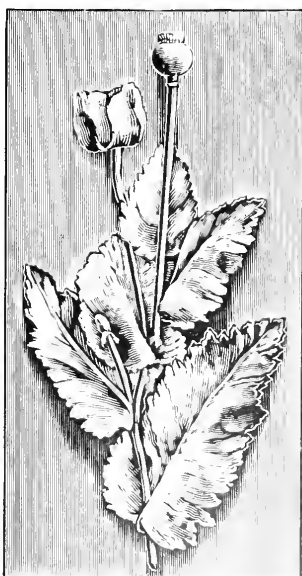
No. 3211—23 x 16 in... \$2.50



No. 3212—17½ x 11 in... \$1.25



No. 3213—15 x 12 in... \$1.50



No. 3214—25 x 13 in... \$2.75



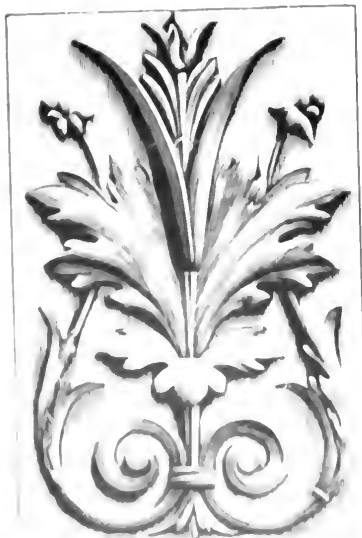
No. 3215—15½ x 13... \$1.50



No. 3216—22 x 15½ in. . . \$2.75



No. 3219—12 x 8½ in. . . 90c



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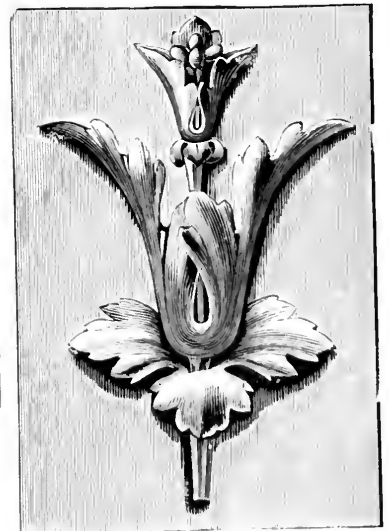
No. 3217—In Three Sections, 31 x 24 in. . . \$5.00



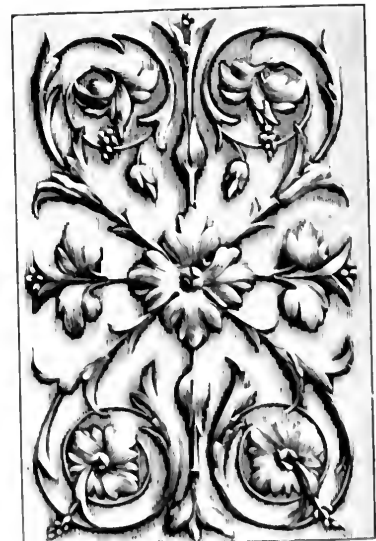
No. 3221—16 x 10½ in. . . \$2.25



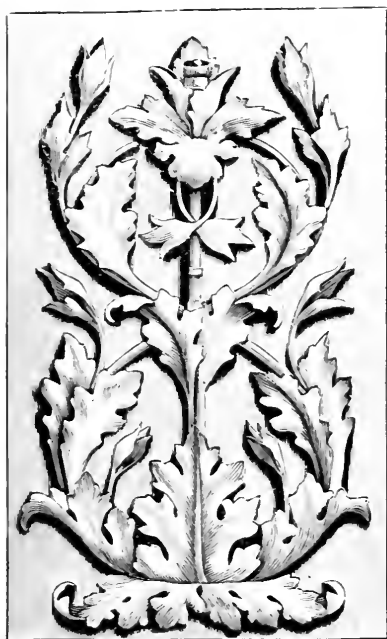
No. 3218—12 x 8½ in. . . 90c.



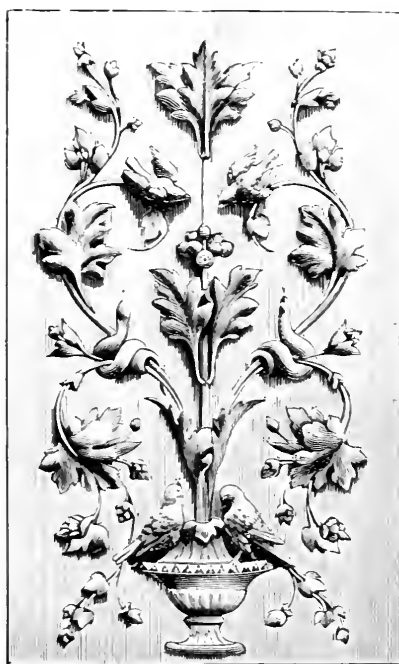
No. 3220—12 x 8½ in. . . 90c.



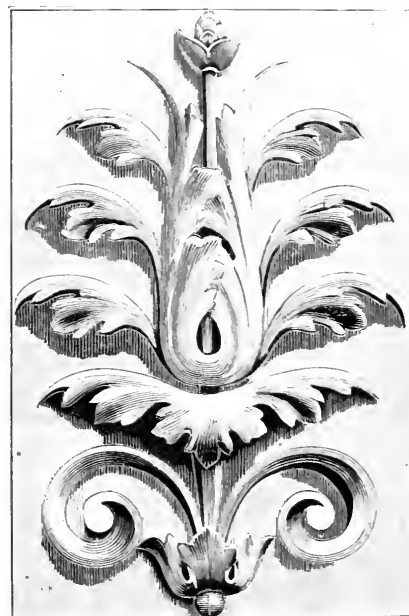
No. 3223—16 x 10½ in. . . \$1.25



No. 3224—21½x13 in.....\$2.25



No. 3225—22x13 in.....\$2.50

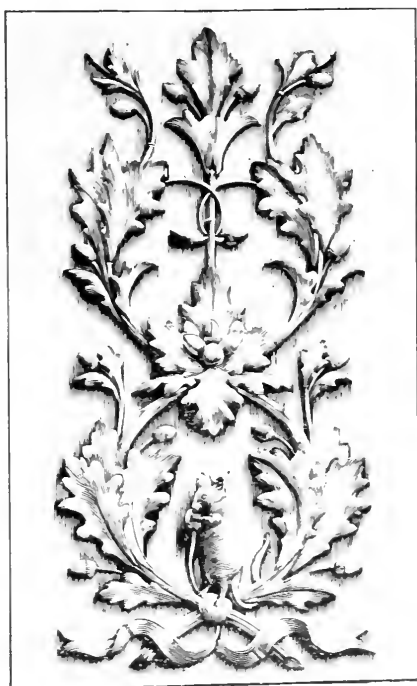


No. 3226—17x10½ in.....\$1.25

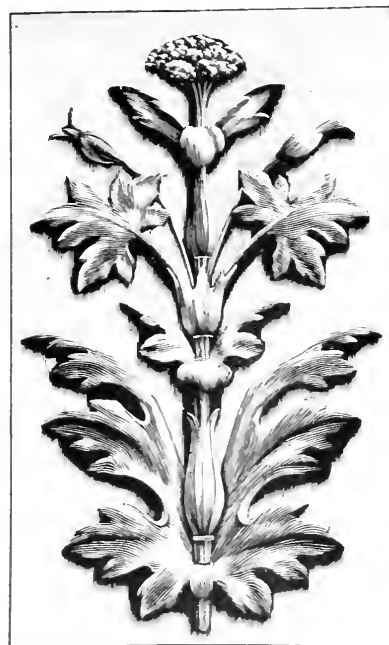
All Plaques have hooks to suspend.



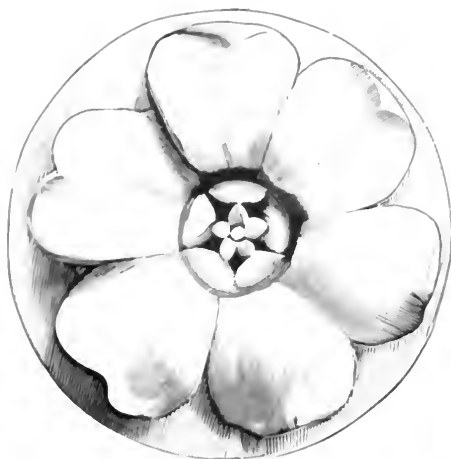
No. 3227—17x10½ in..... \$1.50



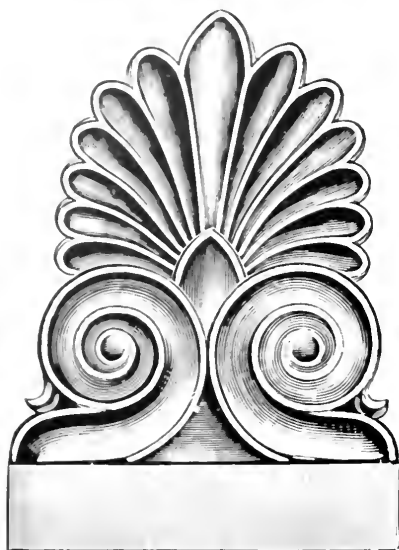
No. 3228—22x13½ in.....\$2.25



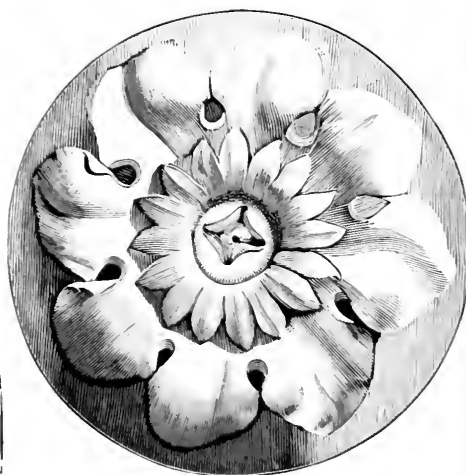
No. 3229—22x13 in\$2.25



No. 3230—14 in. \$2.25



No. 3231—20½ x 15 in. \$2.75



No. 3232—14 in. \$2.25



No. 3233—14 in. \$2.25



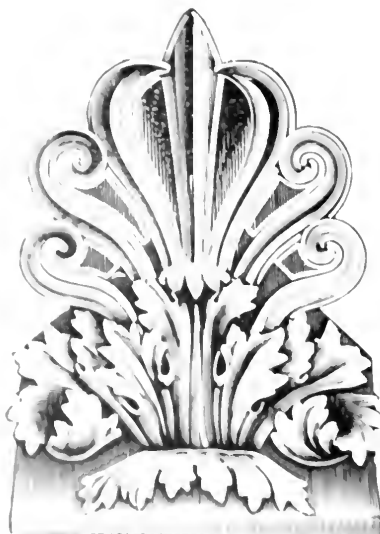
No. 3234—15 x 10½ in. \$1.25



No. 3235—12 in. \$2.00



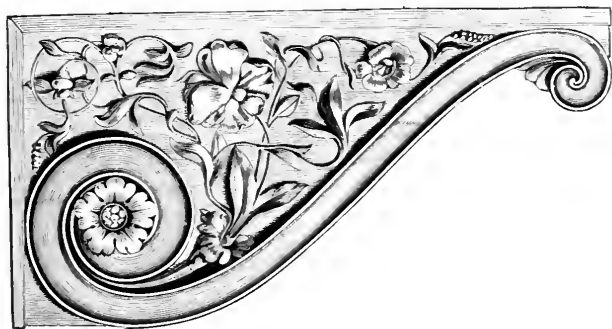
No. 3236—14 in. \$2.25



No. 3237—20½ x 15 in. \$2.75

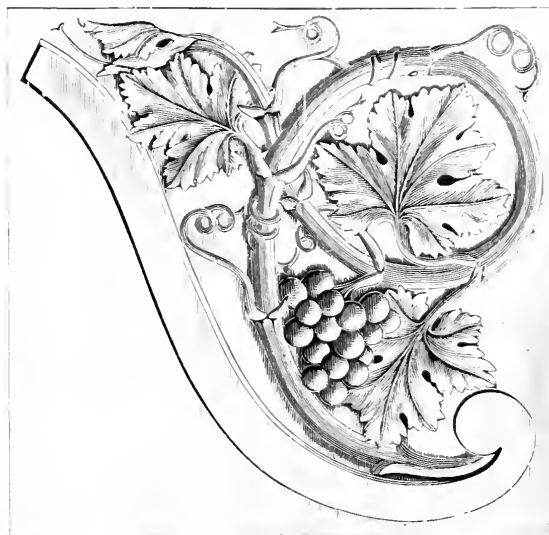


No. 3238—12 in. \$2.00



No. 3239—29 x 15 in.....\$2.50.

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No. 3240—17 x 16 in...\$2.50



No. 3241—8½ x 8½ in....\$1.00



No. 3242—8½ x 8½ in ...\$1.00



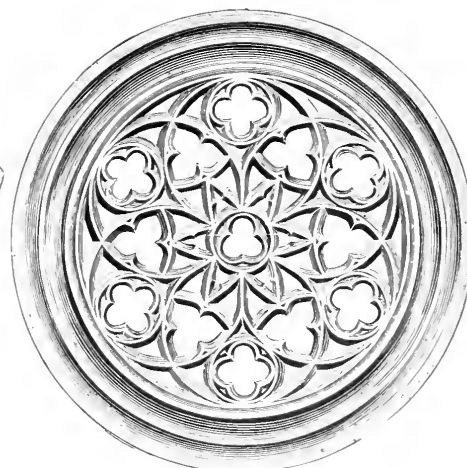
No. 3243—8½ x 8½ in .. \$1.00



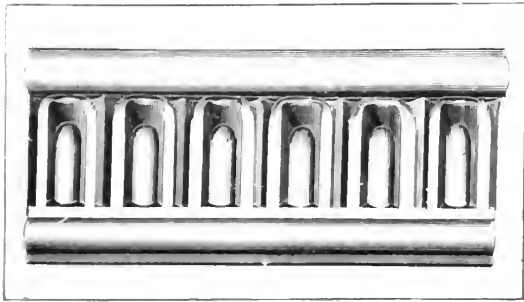
No. 3244—25 x 18 in... \$2.75



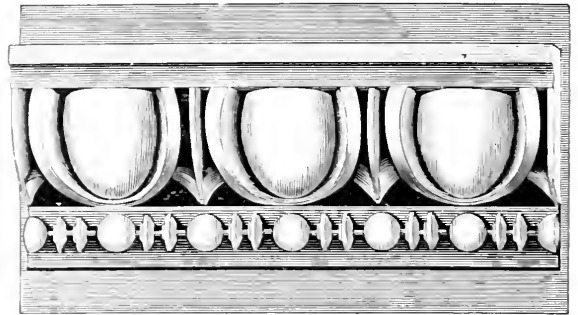
No. 3245—22 x 18 in...\$3.50



No. 3246—10 in.....\$1.50



No. 3247—11 x 6 in. . . 80c.



No. 3248—11 x 6 in. . . 80c.

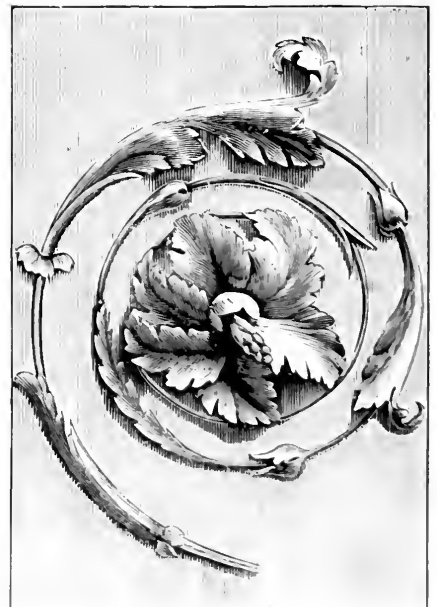


No. 3249—17 x 10½ in. . . \$1.25

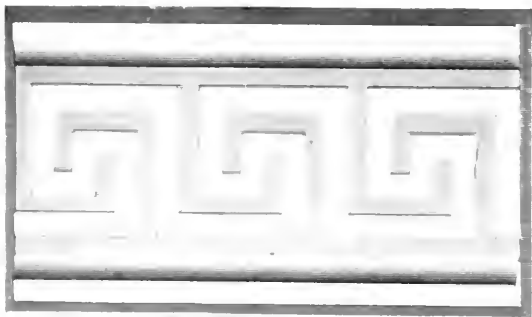
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No. 3250—12 x 8½ in. . . 90c.



No. 3251—17 x 10½ in. . . \$1.25



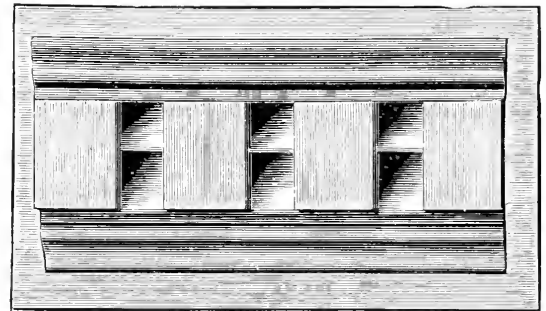
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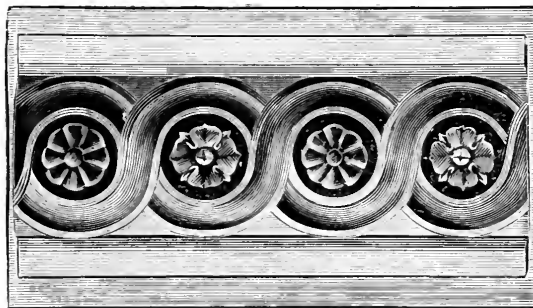
No. 3253—11 x 6 in. . . 80c.



No. 3254—11 x 6 in.....80c.



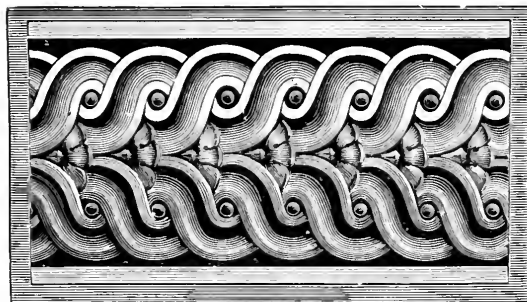
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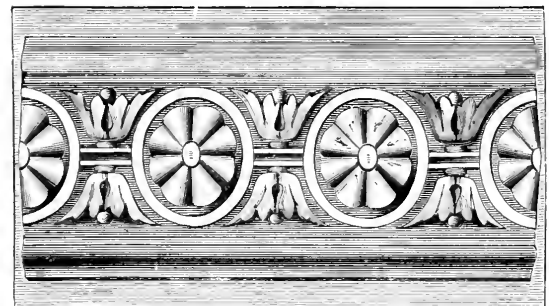
No. 3256—11 x 6 in.....80c.



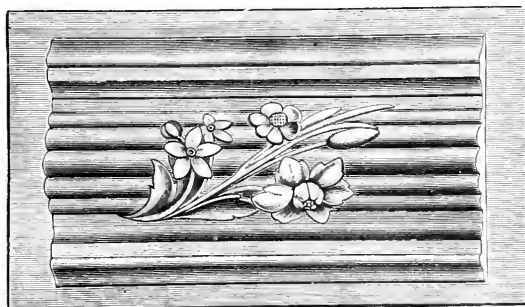
No. 3257—11 x 6 in80c.



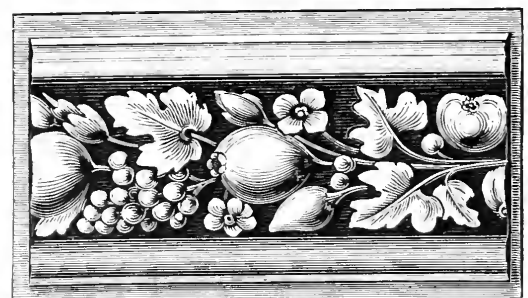
No. 3258—11 x 6 in80c.



No. 3259—11 x 6 in.....80c.



No. 3260—11 x 6 in80c.



No. 3261—11 x 6 in80c.



No. 3262—21 x 12½ in. . . \$3.50



No. 3263—16 x 15 in. . . \$1.75

No. 3264—21 x 14 in. . . \$4.00
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" 3266-1—11½ x 18 in. . . 18.00No. 3267—20 x 15 in. . . \$ 4.50
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" 3267-2—With Scroll, 40½ x 25½ in. . . 12.00No. 3268—11 x 11 in. . . \$ 1.50
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No. 3272—10 in .. 75c

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No. 3247—10 in....75c



No. 3275—26 x 9½ in....\$1.50



No. 3273—39 x 12 in.....\$6.00



No. 3278—26 x 9½ in....\$1.50



No. 3276—10 in....75c.



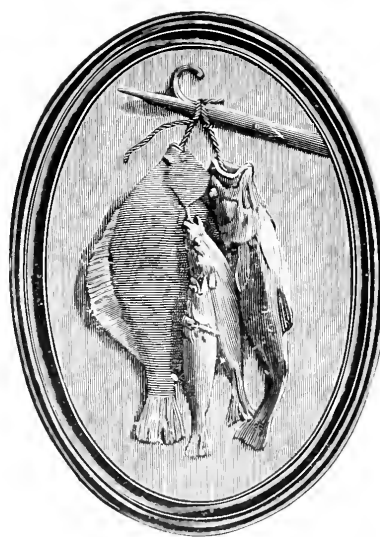
No. 3277—10 in....75c.



No. 3279—25 x 7 in....\$1.50



No. 3280—20 x 14½ in ...\$2.50

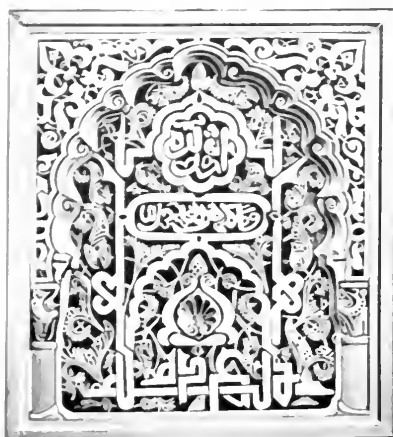


No. 3281—20 x 14½ in....\$2.50

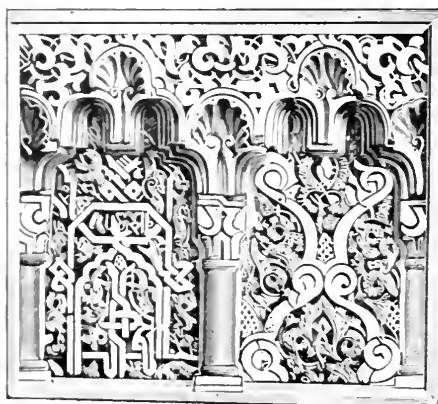


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C. HENNECKE CO. MILWAUKEE AND CHICAGO.



No. 3283—16 x 11 in. . . \$1.50



No. 3284—15½ x 14 in. . . \$1.50

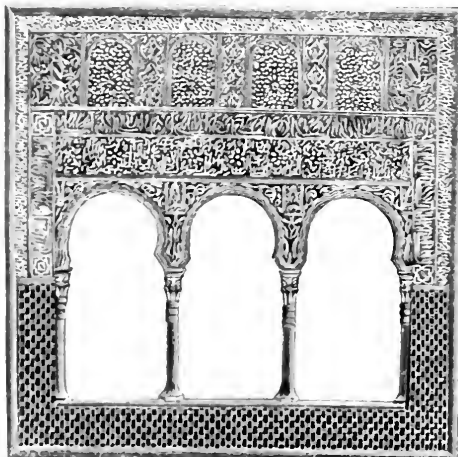


No. 3285—15½ x 12½ in. . . \$1.50

ANTIQUE VASE.



No. 3286—Height, 8½ in. . . \$1.50



No. 3287—15½ x 15½ in. . . \$1.50

VASE DE MEDICI.

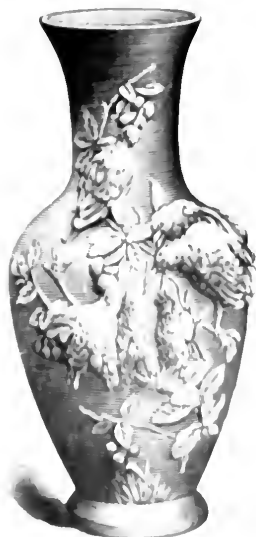


No. 3288—Height, 16 in.; base, 6 x 5½ in. . . \$3.00

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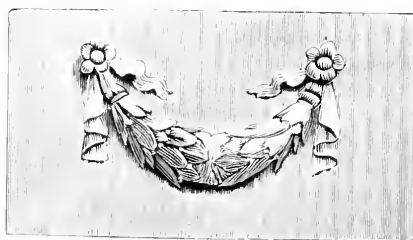
No. 3289—Height, 16 in.; base, 4½ in. . . \$3.00



No. 3291—Height, 16 in.; base, 4½ in. . . \$3.00

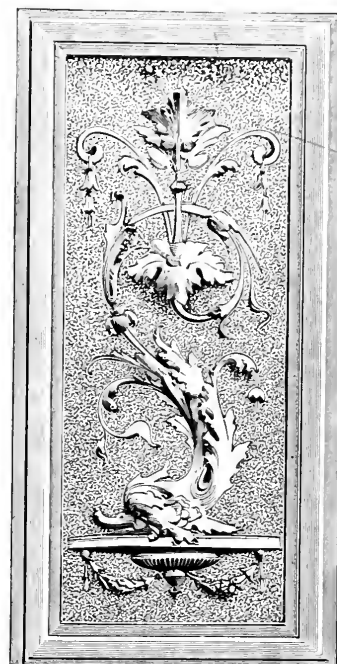


No. 3292—22 x 14½ in. . . \$3.00



No. 3293—17½ x 10 in . . . \$1.25

All Plaques have Hooks for Hanging
attached to the Back.



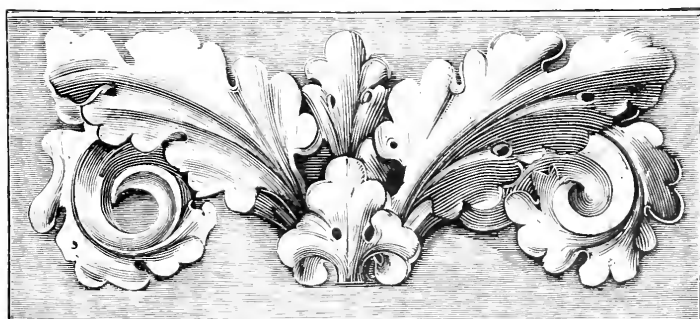
No. 3294—25 x 13 in. . . \$2 50



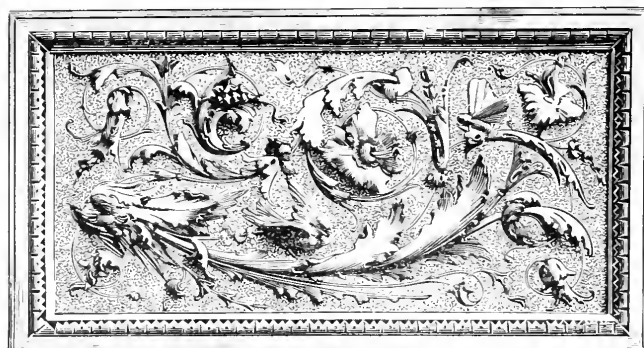
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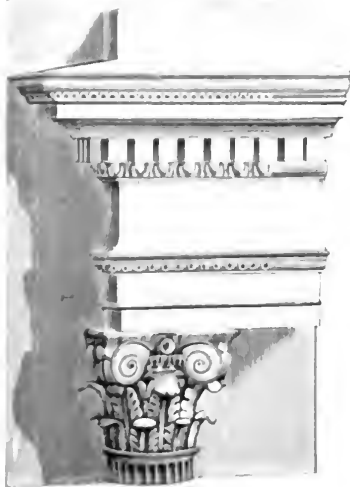


No. 3298—26 x 14½ in. . . \$3.00

C. HENNECKE CO. MILWAUKEE and CHICAGO.

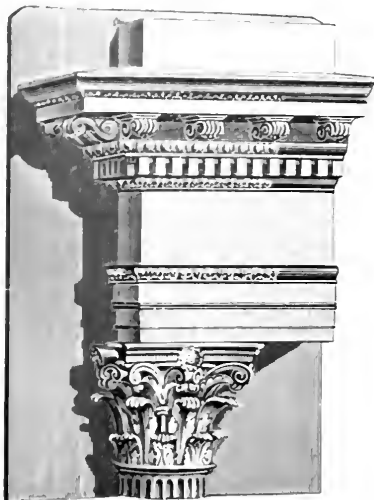
FIVE ORDERS OF ARCHITECTURE.

COMPOSITE.



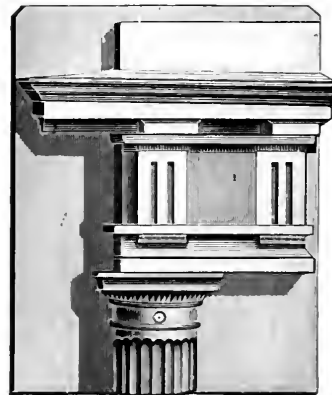
No. 3299—Height, 19 in.

CORINTHIAN.



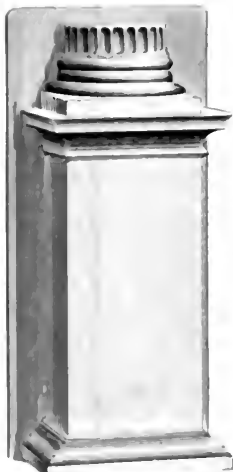
No. 3300—Height, 19 in.

DORIC.



No. 3301—Height, 16 in.

COMPOSITE.



No. 3302—Height, 18 in.

IONIC.

CORINTHIAN.

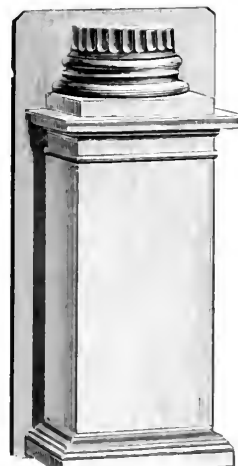


No. 3303—Height, 18 in.

IONIC.

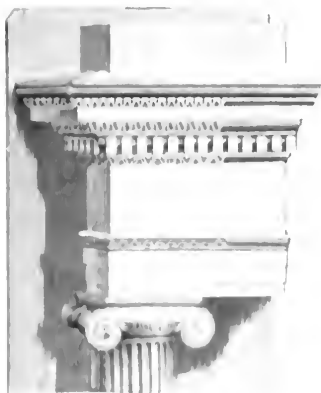
TUSCAN.

DORIC.



No. 3304—Height, 16 in.

TUSCAN.

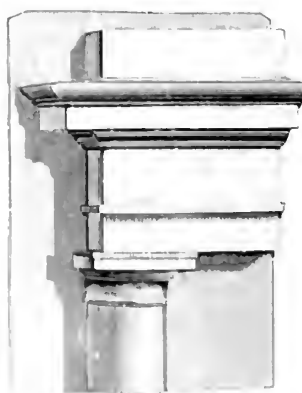


No. 3305—Height, 16 in.

For full particulars of these and all other articles, see our Circulars.



No. 3306—Height, 16 in.



No. 3307—Height, 16 in.



No. 3308—Height, 16 in.

\$30.40

7.50

All have Hooks to suspend

ITALIAN RENAISSANCE.

From Portal St Maria de Miracoli
Venice.



No. 3309—18 x 13 in. . \$4.00

ITALIAN RENAISSANCE.

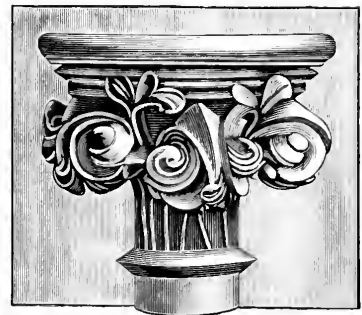
Capital of Pilaster, Florence, Palace Vecchio.



No. 3310—11 x 9 in. . \$2.00

CAPITAL.

From Temple Church, London



No. 3311—15½ x 12 in. . . \$2.50

CAPITAL.

From Stone Church in Kent.



No. 3312—17½ x 16 in. . . \$4.00

ITALIAN RENAISSANCE.



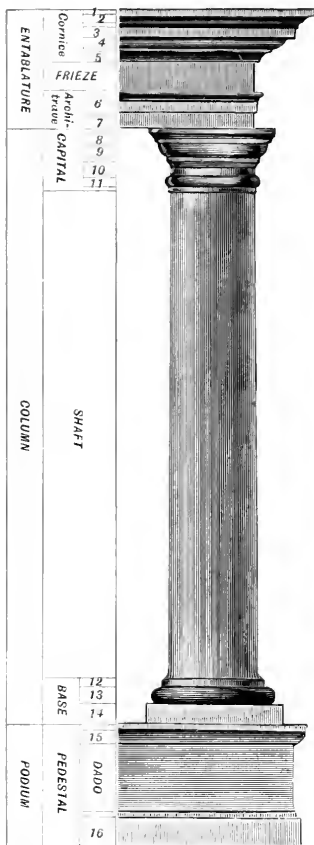
No. 3313—18 x 10½ in. . . \$1.50

BYZANTINE.



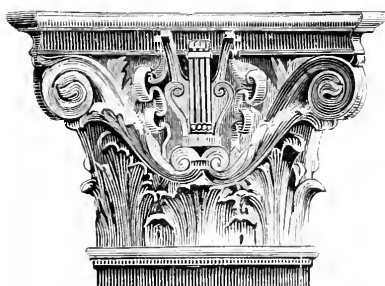
No. 3316—8 x 6½ in. . . \$1.25

PARTS OF A COLUMN.



1. Fillet.
2. Cyma recta.
3. Corona.
4. Ovolo.
5. Cavetto.
6. Upper Fascia.
7. Lower Fascia.
8. Abacus.
9. Ovolo.
10. Colareno, or Neck.
11. Astragal.
12. Fillet or Reglet.
13. Torus.
14. Plinth.
15. Surbase.
16. Base.

ITALIAN RENAISSANCE.



No. 3314—18 x 13 in. . \$4.00

ITALIAN RENAISSANCE.

Roman Corinthian.



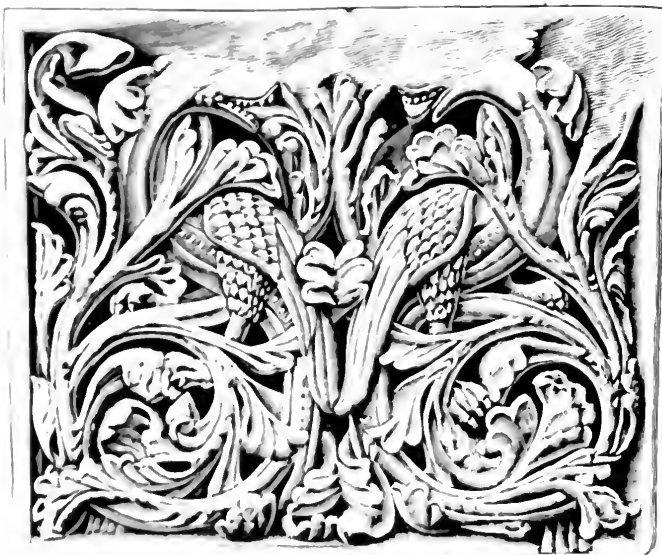
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No. 3317—18 x 13½ in. . . . \$1.75

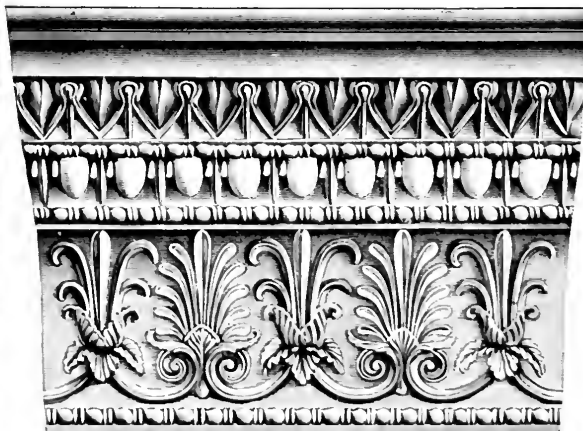


No. 3318—18 x 13½ in. . . . \$1.75

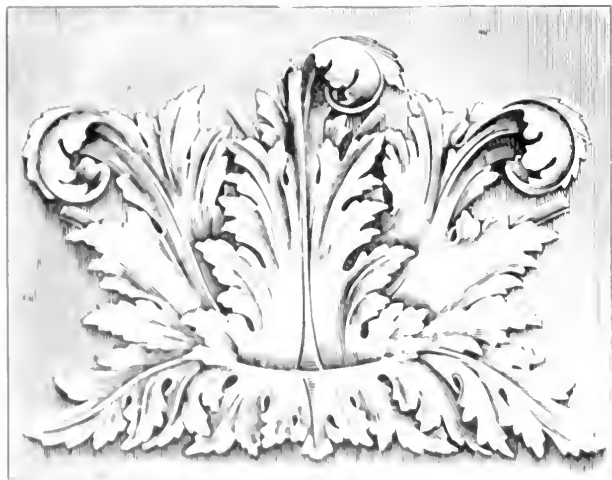


No. 3319—21 x 17 in. . . . \$3.50

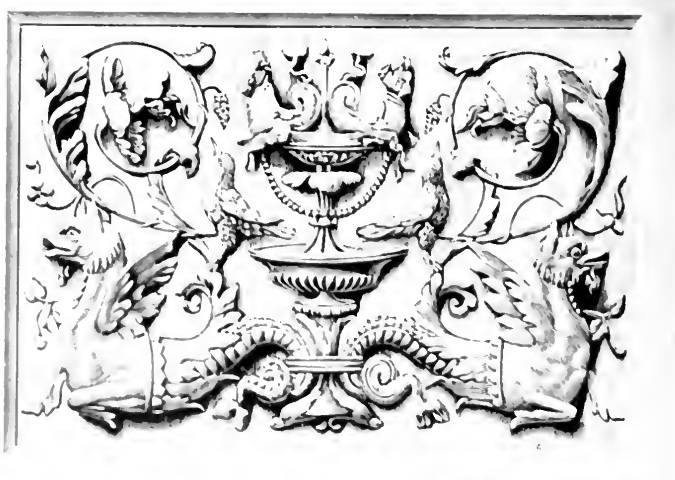
Hooks for Hanging are attached to the back.



No. 3320—26 x 20 in. . . . \$3.50



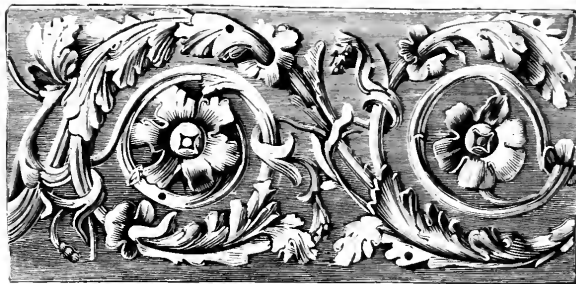
No. 3321—21 x 17 in. . . . \$3.50



No. 3322—24 x 18 in. . . . \$3.75



No. 3323—28 x 12½ in. . . . \$2.75



No. 3324—33 x 15½ in. . . . \$3.50



No. 3325—In Three Sections, 40 x 12½ in. . . . \$4.00

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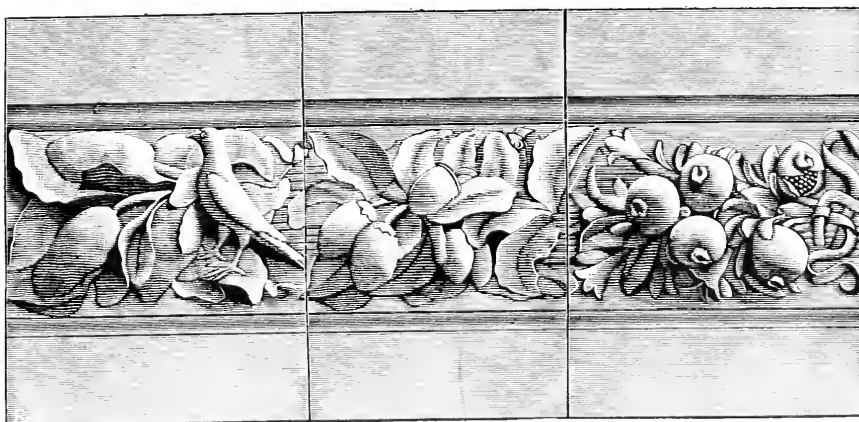
No. 3326—In Three Sections, 40 x 16½ in. . . . \$4.50



No. 3327—25 x 12 in. . . . \$3.00



No. 3328—19 x 13½ in. . . . \$2.50

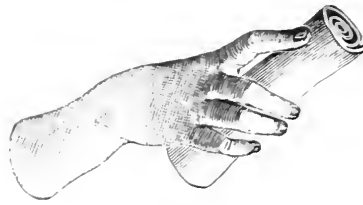


No. 3329—In Three Sections, 38 x 18 in. . . . \$3.50

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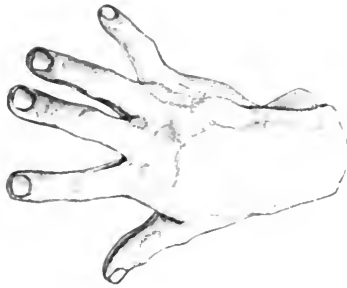
No. 3330—10 in. \$1.25



No. 3331—12 in. \$1.25



No. 3332—9 in. 90c.



No. 3333—12 in. \$1.25



No. 3334—10 in. 90c.



No. 3335—6 in. 50c.



No. 3336—7 in. 50c.



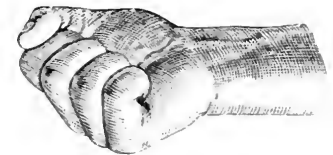
No. 3337—11 in. \$1.00



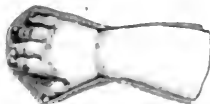
No. 3338—11 in. \$1.25



No. 3339—10 in. \$1.00



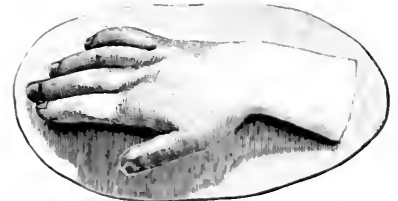
No. 3340—9 in. \$1.00



No. 3341—6 in. 50c.



No. 3342—5 in. 50c.



No. 3345—11 in. \$1.00



No. 3343—7 in. 50c.



No. 3344—8 in. 80c.



No. 3346—5 in. 50c.



No. 3347—10 in. \$1.00



No. 3348—10 in. \$1.25

Hooks for hanging are attached to all Casts that have no base.



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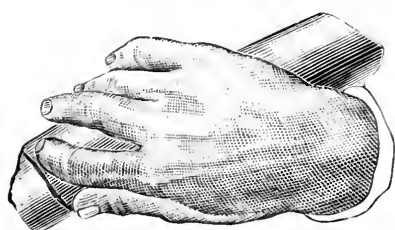
No. 3350—5 in... 50c.



No. 3351—5 in... 50c.



No. 3352—7 in... 60c.



No. 3353—12 in... \$1.50



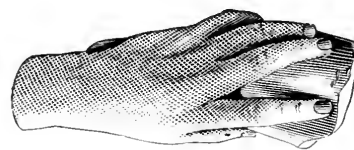
No. 3354—6 in... 75c.



No. 3355—11 in... \$1.00



No. 3356—10 in... \$1.25



No. 3357—12 in... \$1.25



No. 3358—8 in... \$1.25



No. 3359—12 in... \$1.00



No. 3360—15 in... \$1.25



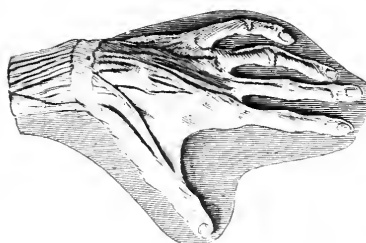
No. 3363—16 in... \$2.00



No. 3361—6 in... 50c.



No. 3362—12 in... \$1.25



No. 3364—11 in... \$1.00



No. 3365—12 in... \$1.25

C. HENNECKE CO MILWAUKEE and CHICAGO



No. 3366—10 in. . . \$1.25



No. 3367—6 in. . . 50c.



No. 3368—12 in. . . \$1.25



No. 3369—9½ in. . . \$1.50



No. 3370—7½ in. . . 75c.



No. 3371—12 in. . . \$1.20



No. 3372—12 in. . . \$1.25



No. 3373—8 in. . . \$1.50



No. 3375—12 in. . . \$1.50



No. 3374—10 in. . . 90c



No. 3379—6 in. . . \$1.00



No. 3379—33 in. . . \$2.50

Hooks for hanging are attached to all Casts that have no base.



No. 3380—27 in...\$2.50



No. 3381—13 in...\$1.00

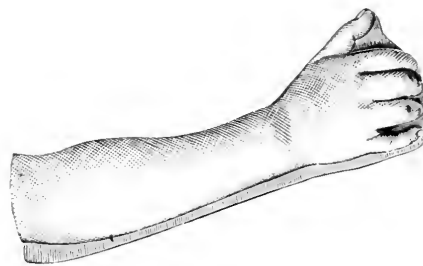
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No. 3383—7 in...\$1.25



No. 3384—11 in...\$1.00



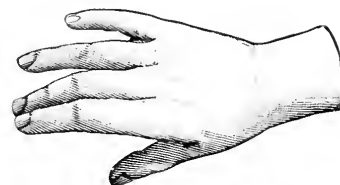
No. 3385—6 in...50c.



No. 3386—5 in...50c.



No. 3387—5 in...50c.



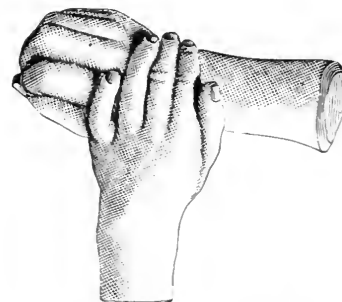
No. 3388—8½ in...\$1.00



No. 3389—10½ in...\$1.00



No. 3390—8 in...75c.



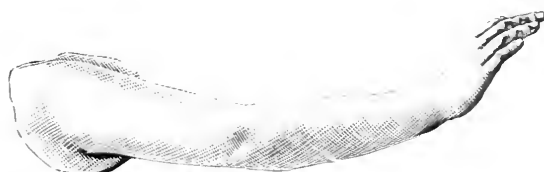
No. 3393—11 in...\$1.50



No. 3391—8 in...80c.



No. 3392—5 in...50c.



No. 3394—27 in...\$2.00

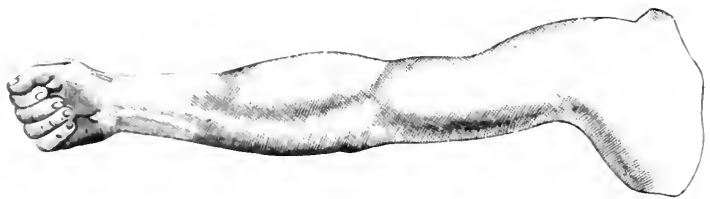


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C. HENNECKE CO. MILWAUKEE AND CHICAGO.



No. 3396—30 in. . . \$2.00



No. 3397—30 in. . . \$2.50

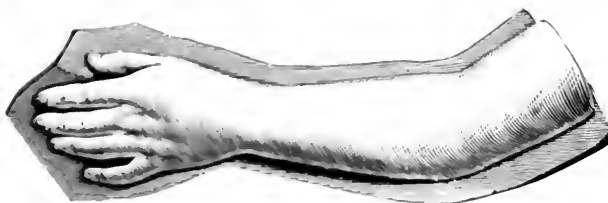
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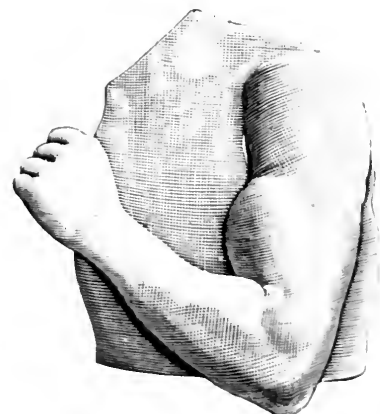
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No. 3400—18 in. . . \$1.50



No. 3401—33 in. . . \$2.50



No. 3402—17 in. . . \$1.00



No. 3403—12 in. . . \$1.00



No. 3404—21 in. . . \$2.50



No. 3407—12 in....\$1.00



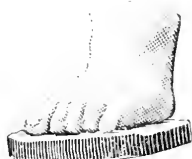
No. 3405—6 in ...60c.



No. 3409—10 in...\$1.25



No. 3406—9½ in....\$1.25



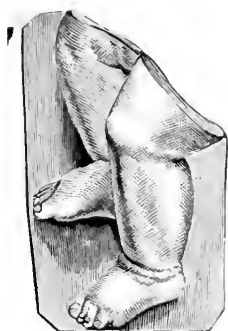
No. 3408—5 in... 50c.



No. 3411—7½ in .. \$1.00



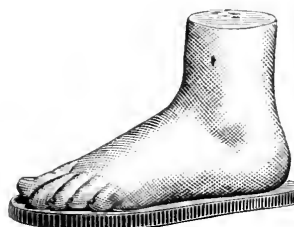
No. 3410—9½ in....\$1.25



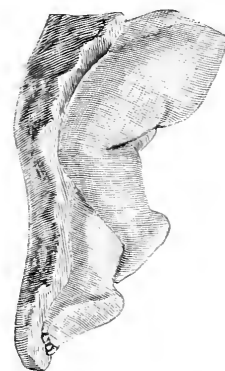
No. 3412—10 in....\$1.50



No. 3413—18 in... \$2.00



No. 3414—10 in...\$1.00



No. 3415—17 in....\$2.50

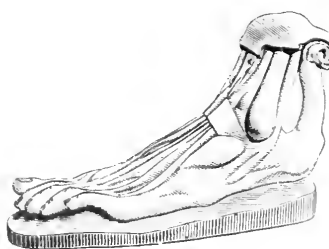
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No. 3417—23 in ...\$2.00



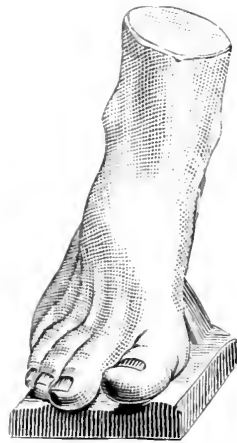
No. 3418—10½ in....\$1.25



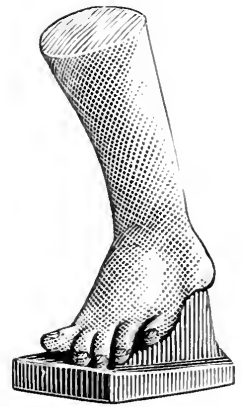
No. 3419—11 in....\$1.25



No. 3420—11 in ... \$1.00



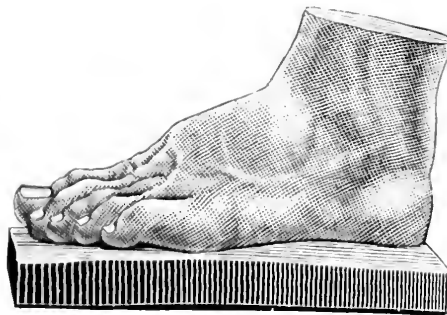
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No. 3429—7 in . . .50c.



No. 3430—8 in . . .50c.



No. 3431—5 in . . . 40c.



No. 3432—6 in . . .50c.



No. 3433—7 in . . . 60c.



No. 3434—5 in . . .50c.



No. 3435—5 in . . .40c.



No. 3436—9 in . . . \$1.50



No. 3437—5 in . . .40c.

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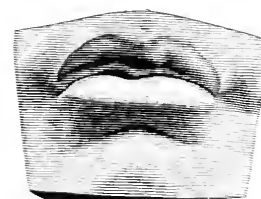
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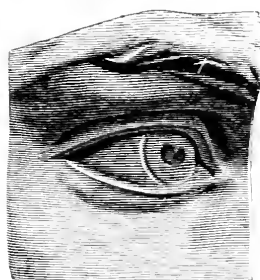


No. 3439—5 in . . .60c

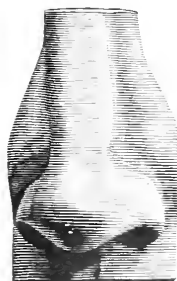


No. 3440—6 in . . .50c.

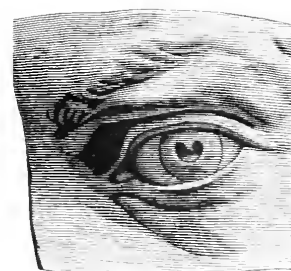
All Casts are named and classified in Index.



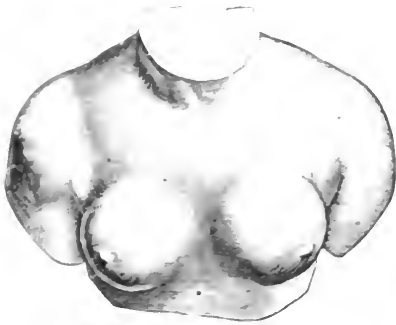
No. 3441—7½ in . . 60c.



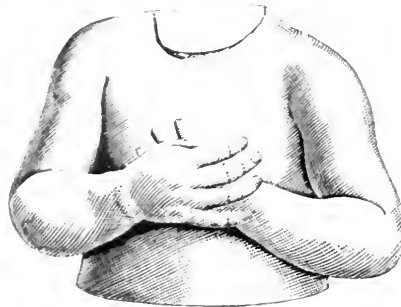
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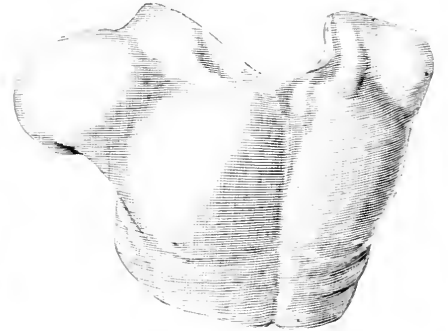
No. 3443—7½ in . . 60c



No. 3444—12 in ... \$1.50



No. 3445—15 in... \$2.00



No. 3446—21 in .. \$2.50



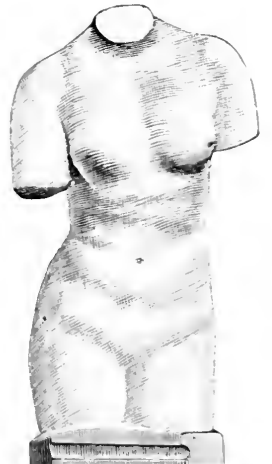
No. 3447—21 in... \$3.00



No. 3448—13 in .. \$1.50



No. 3449—18 in .. \$2.00



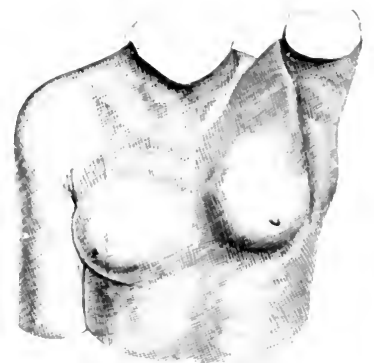
No. 3450—21 in .. \$3.00



No. 3451—21 in .. \$4.00



No. 3452—31 in .. \$1.50



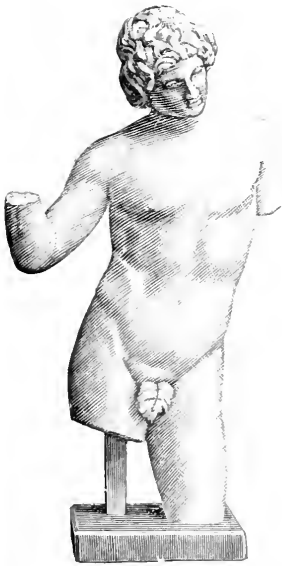
No. 3453—14 in .. \$3.00

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CLASSICAL STATUARY. BUSTS AND MODELS

13



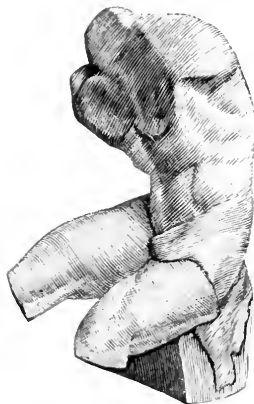
No. 3454—25 in .. \$1.50



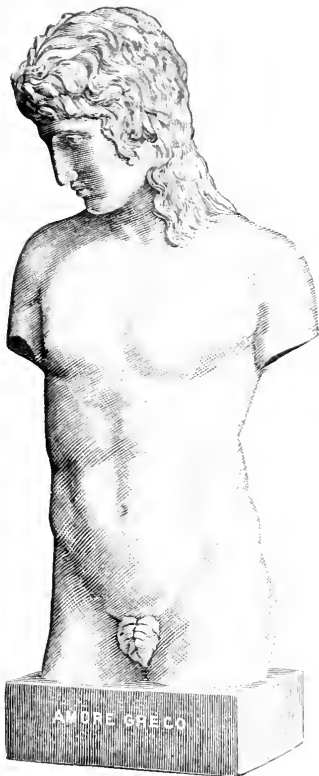
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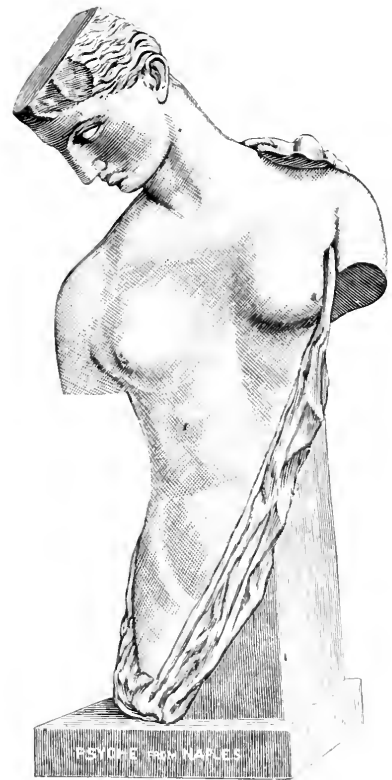
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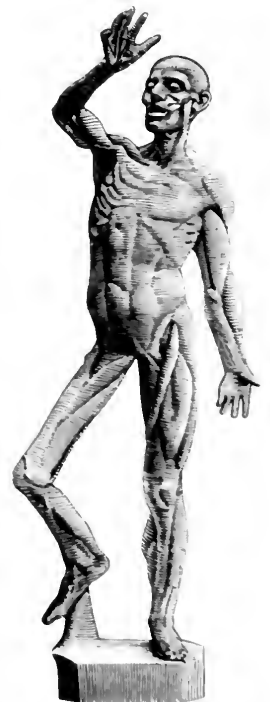
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No. 3468—10 in ...\$1.75



No. 3469—40 in\$ 9.00

No. 3470— 6 ft.50.00

No. 3470 has right arm extended,
legs nearly straight. Round base.



No. 3471—8 in. . . \$1.25



No. 3472—11½ in. . . \$1.50



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No. 3474—9 in. . . \$1.25



No. 3475—20 x 14 in. . . \$3.50



No. 3476—9 in. . . \$1.25



No. 3477—10 in. . . \$1.50



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No. 3481—15 in. \$1.75 No. 3485—9x7½ in. \$1.00



No. 3486—8½ in. .75c.



No. 3487—9 in. .75c.



No. 3488—15 in. \$1.75

•• MASKS. ••

NOT ILLUSTRATED.

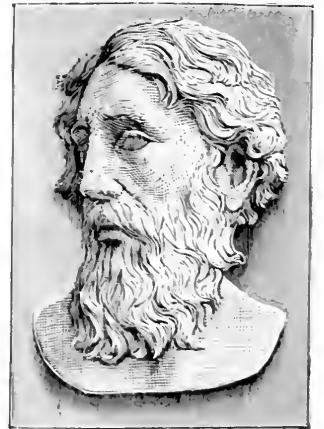


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No. 3491—12 in. \$2.00

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3493—Aeschylus.....	14	\$1.50
3494—Augustus.....	13	1.00
3495—Ajax.....	18	2.00
3496—Antinous.....	13	1.00
3497—Agrippa.....	15	1.50
3498—Caligula.....	19	2.00
3499—Canova.....	14	1.50
3500—Christ (on foot), by M. Angelo,	24	5.00
3501—Cicero.....	14	1.25
3502—Clytie.....	14	1.50
3503—Dante.....	9	1.00
3504—David, by M. Angelo.....	20	5.00
3505— " " " on foot...	30	10.00
3506— " " " ".....	24	6.00
3507—Demosthenes.....	14	1.50
3508—Diana.....	15	1.25
3509—Diomedes.....	16	1.50
3510—Discobolus—Nancydes.....	13	1.25
3511—Dying Warrior.....	13	1.25
3512—Euripides.....	15	1.50
3513—Fighting Gladiator.....	16	1.50
3514—Juliano DeMedici.....	16	1.50
3515—Juno Capitol.....	13	1.00
3516—Jupiter.....	28	5.00
3517—Madonna.....	14	1.50
3518—Mercury.....	14	1.25
3519—Minerva.....	14	1.00
3520—Moses.....	19	2.00
3521—Nero.....	14	1.50
3522—Niohe Daughter.....	13	1.00
3523—Nubian Girl.....	12	1.25
3524—Psyche of Naples.....	12	1.00
3525—Rafael Dorbino.....	13	1.25
3526—St. Francis.....	14	1.25
3527—St. Jerome.....	16	2.00
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3529—Sophocles.....	15	1.50
3530—Spartacus.....	13½	1.50
3531—Venus Arles.....	16	1.50
3532— " Bath.....	12	1.00
3533— " Capitol.....	11	1.25
3534— " Capua.....	14	1.25
3535— " Guidos.....	12	1.00
3536— " Medici.....	12	1.00
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3538— " Thorwaldsen.....	13	1.00
3539—Voltaire.....	13	1.50



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•• DEATH MASKS. ••

3490—Beethoven.....	9	1.00
3491—Dante.....	8	1.00



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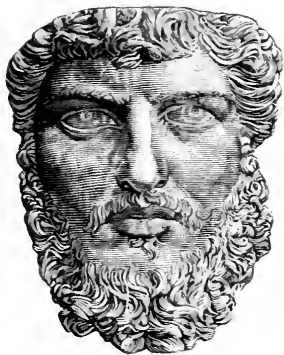


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No. 3545—22 in \$3.50

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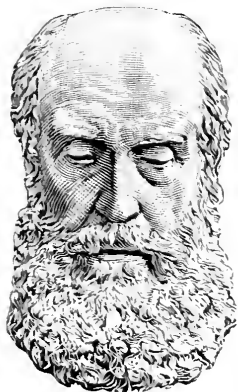


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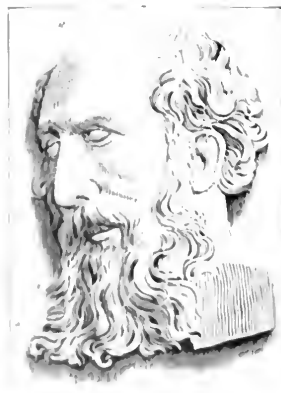
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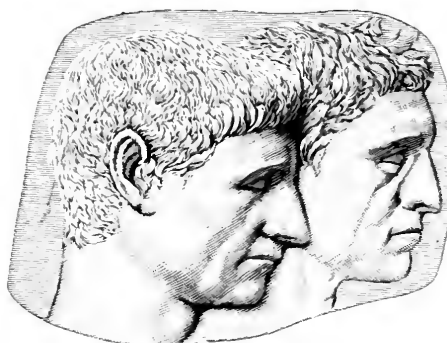


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All Plaques have Hooks
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Column, not Illustrated,
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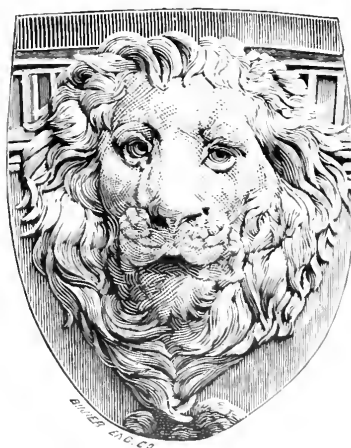


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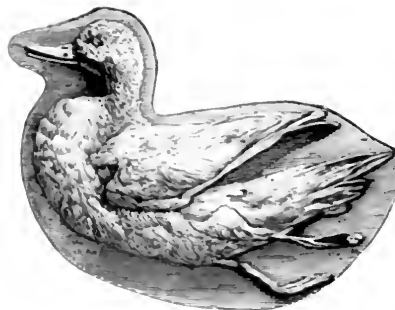


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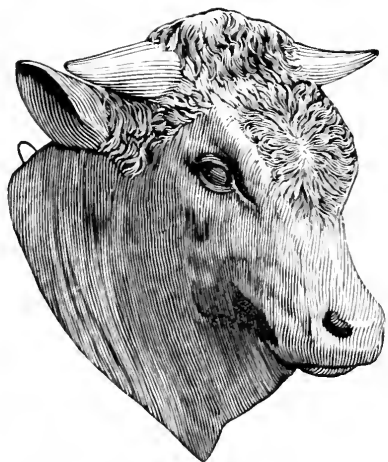
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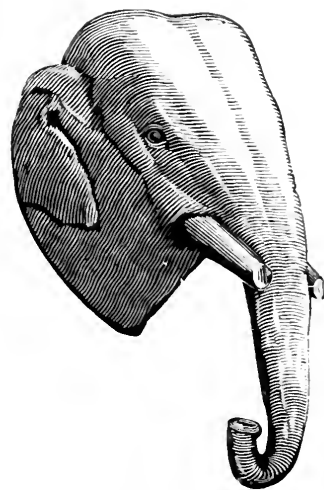
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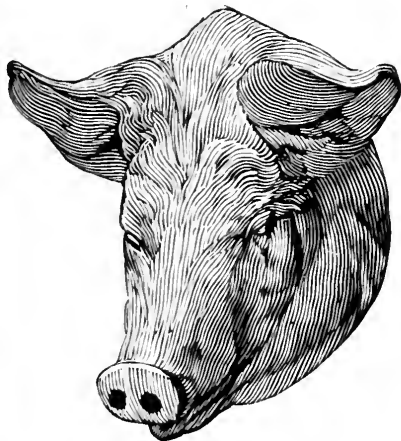


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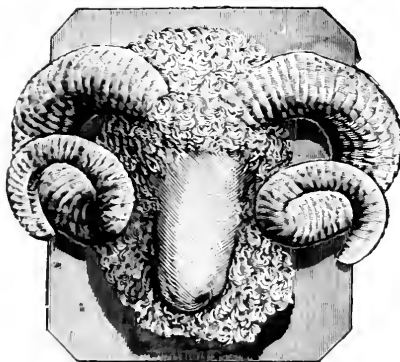


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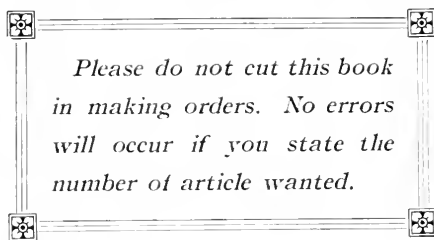
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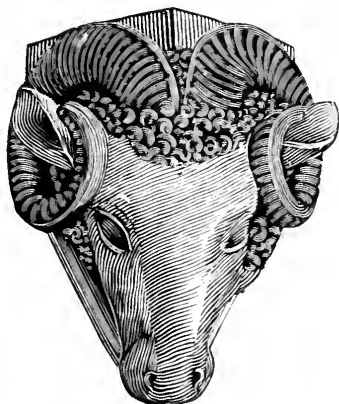
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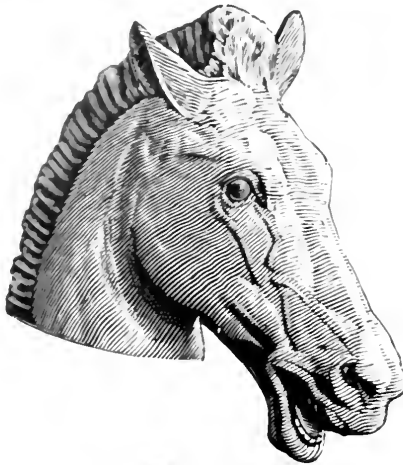
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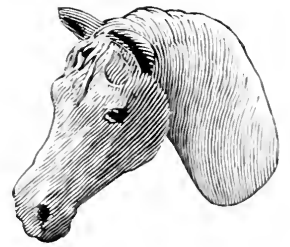
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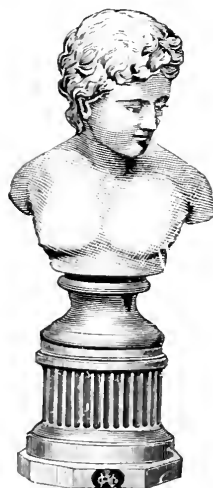


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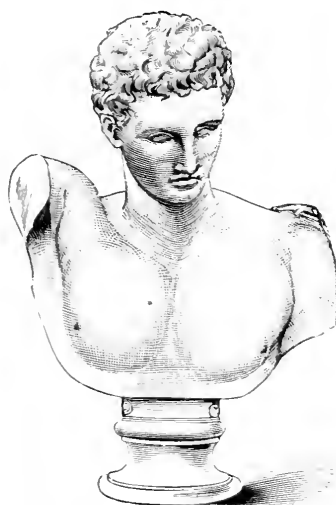
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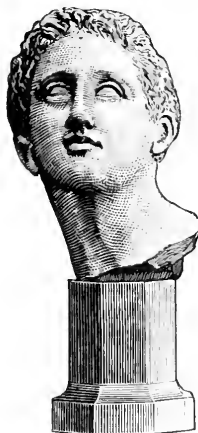
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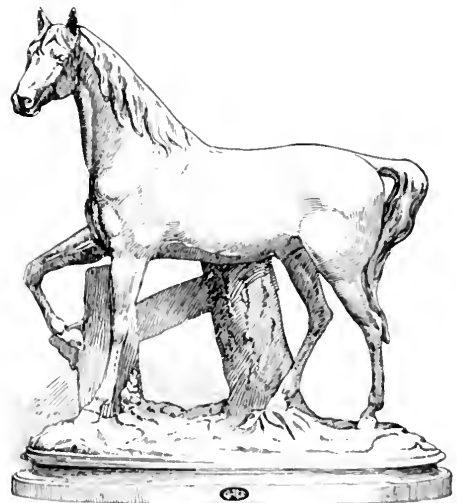
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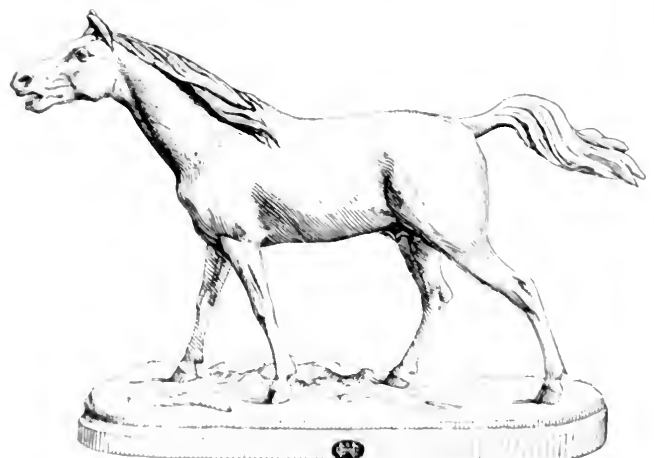
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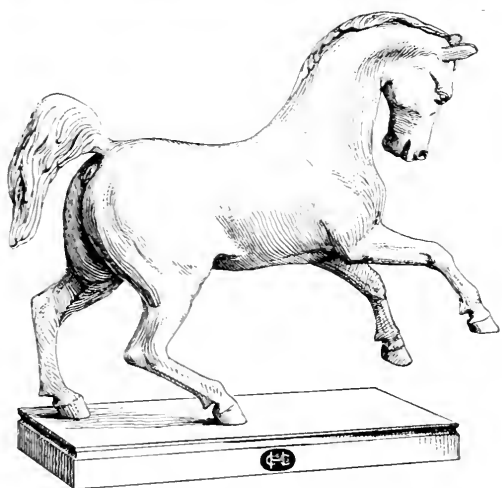
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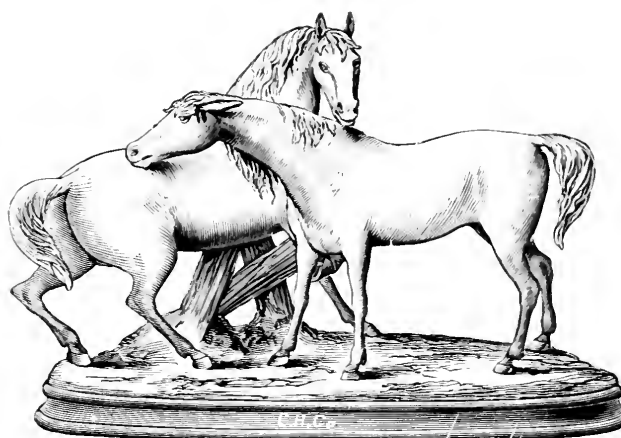
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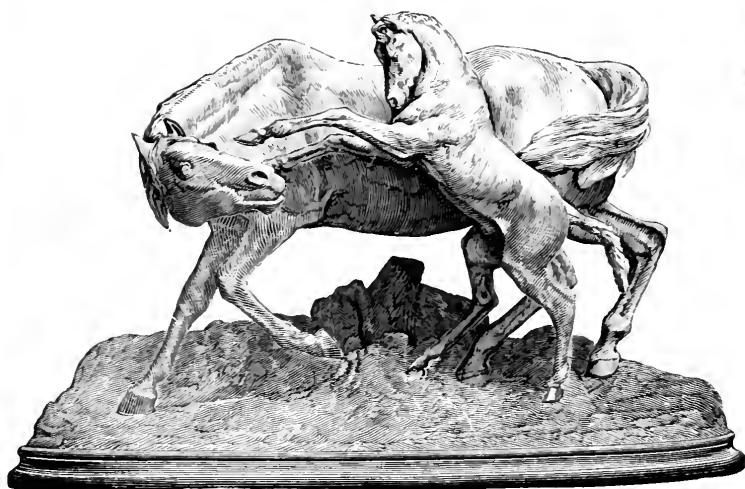
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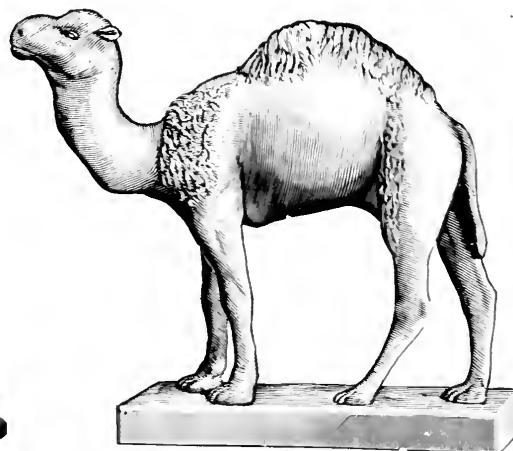
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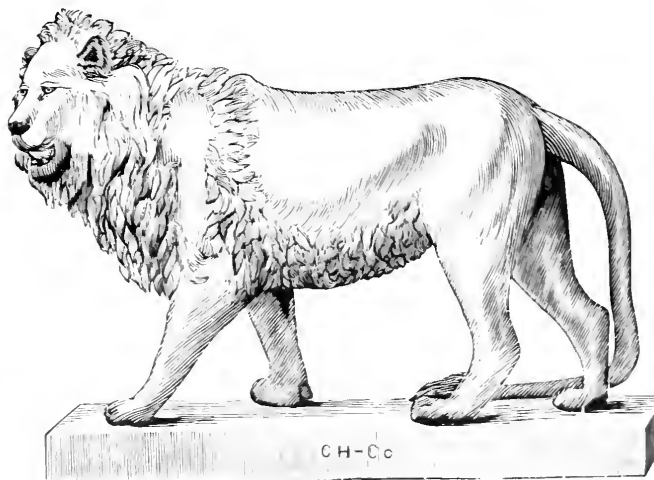
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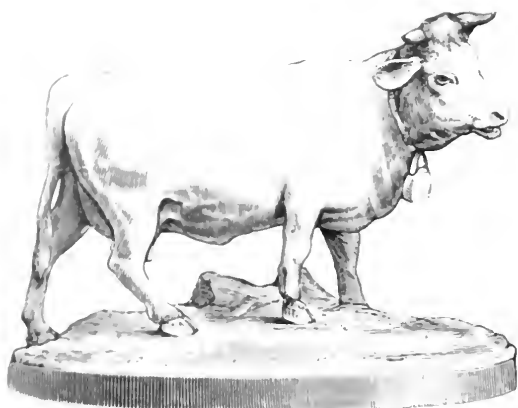


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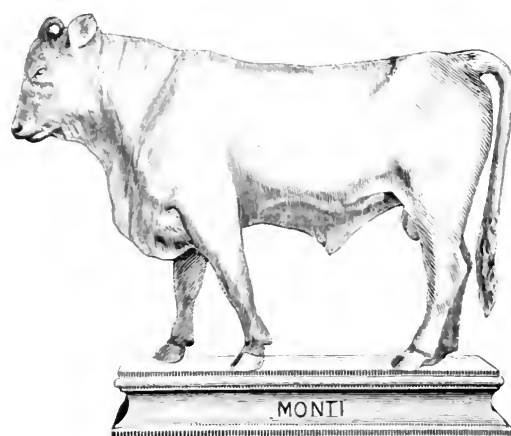


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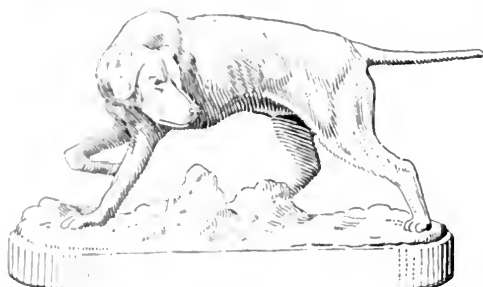
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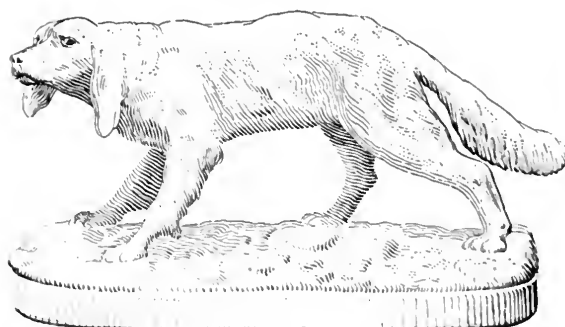
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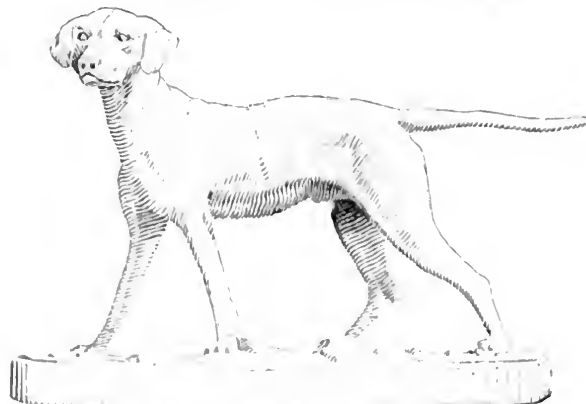
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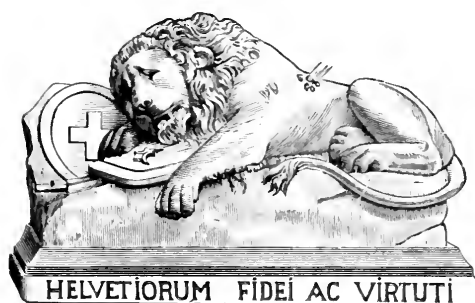
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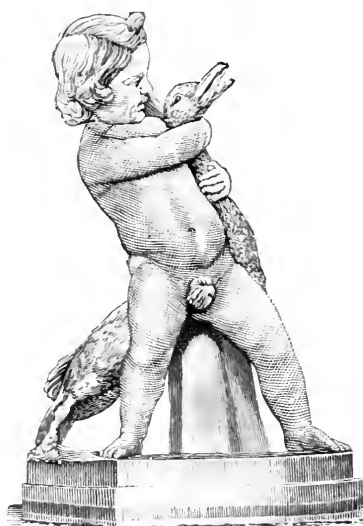
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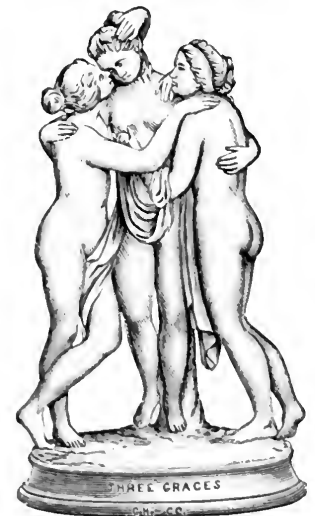
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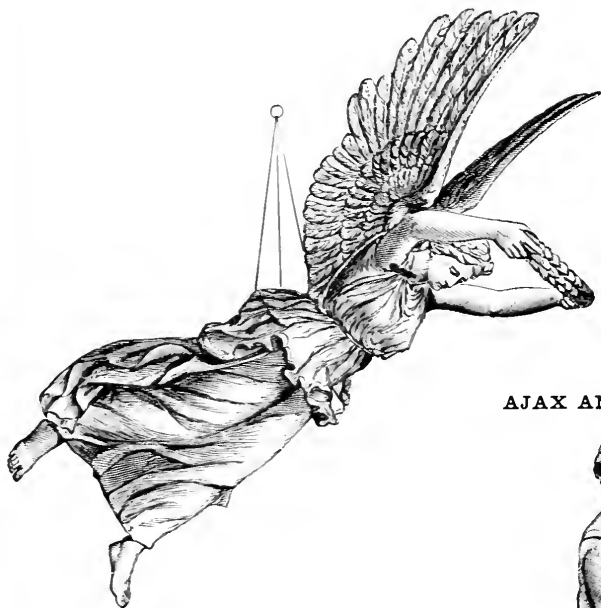
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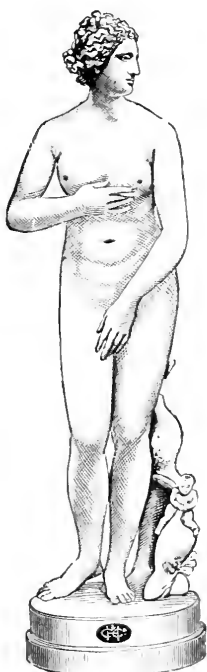
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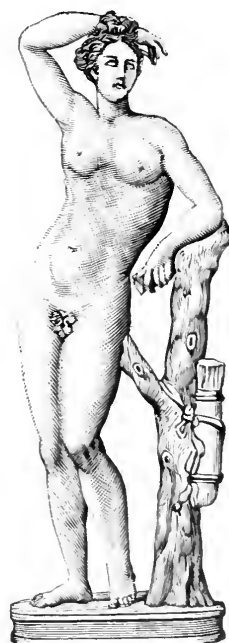
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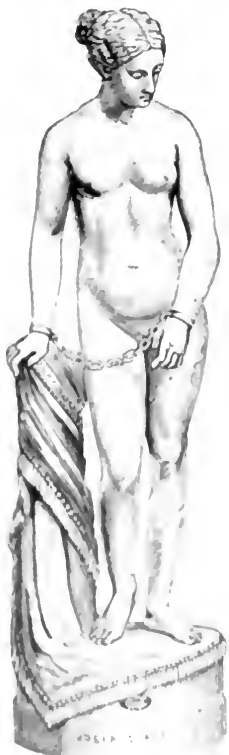
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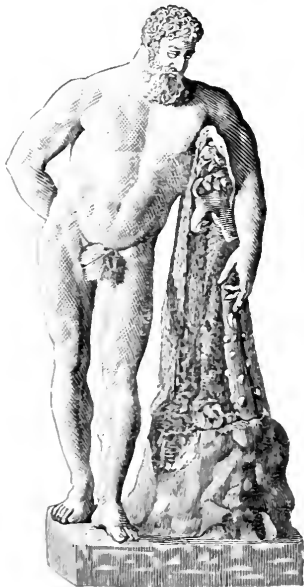


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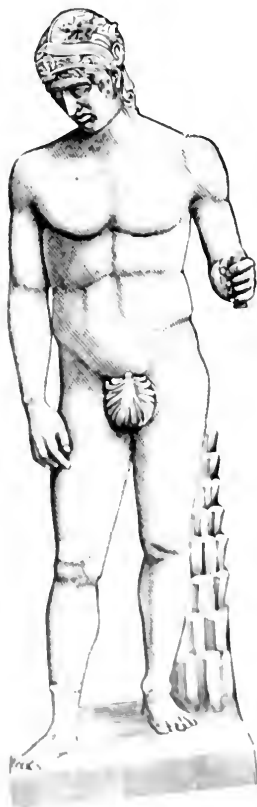
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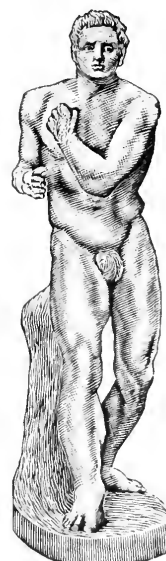
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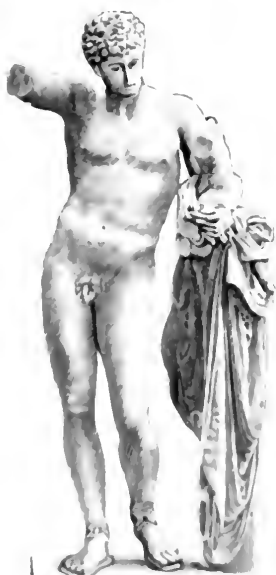
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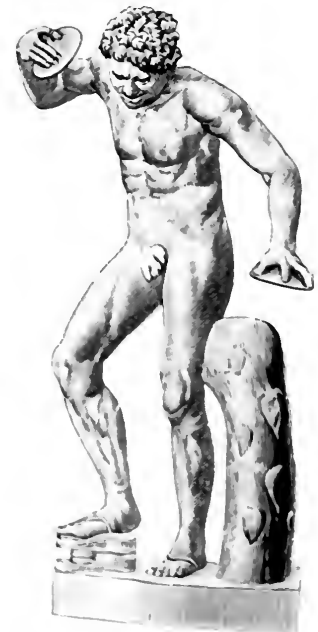
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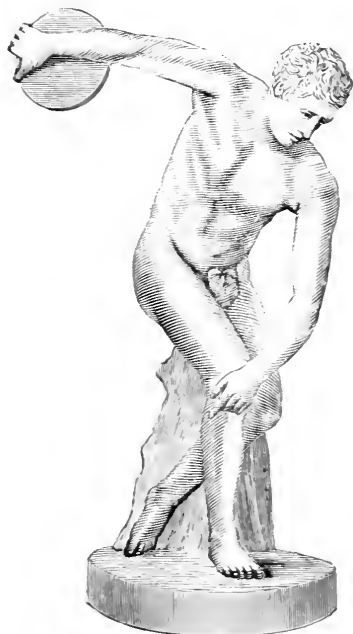


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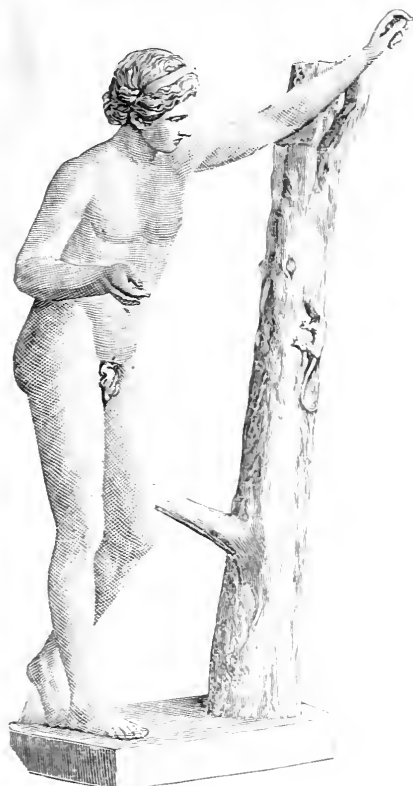
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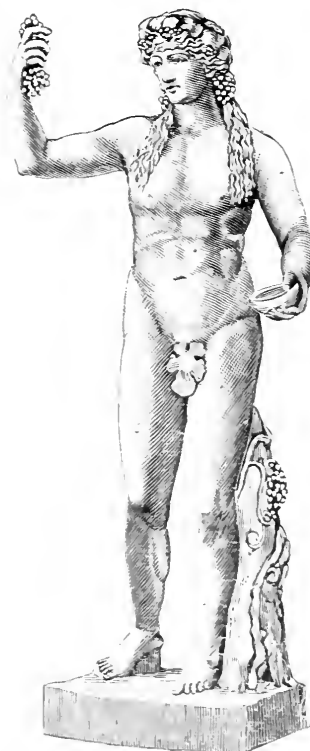
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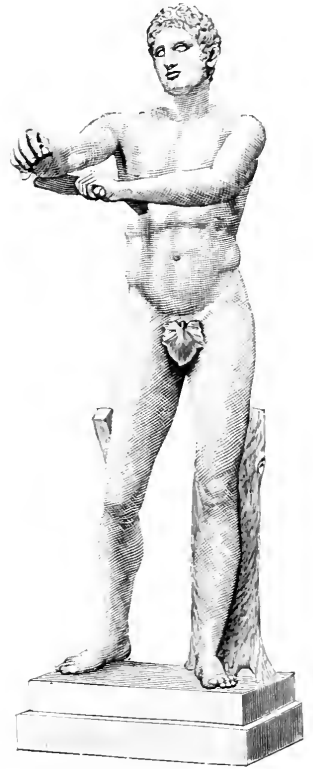
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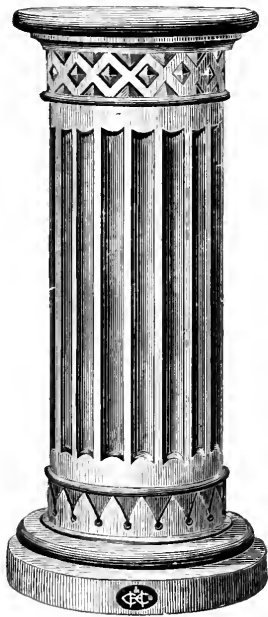
NIGHT.



DAY.

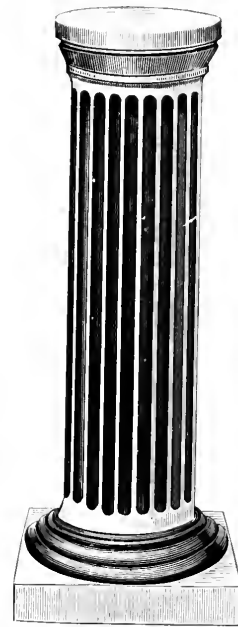


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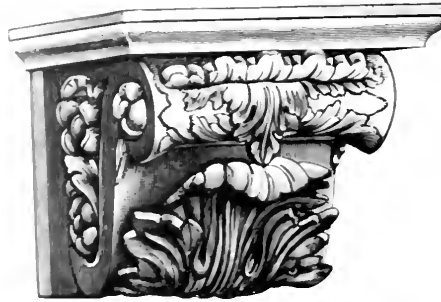
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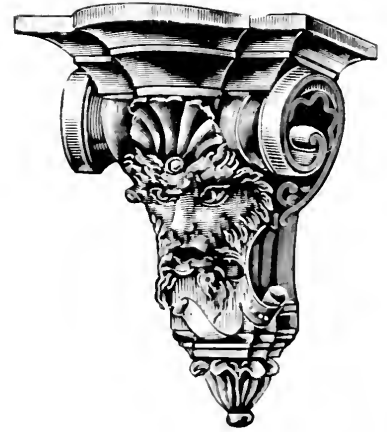


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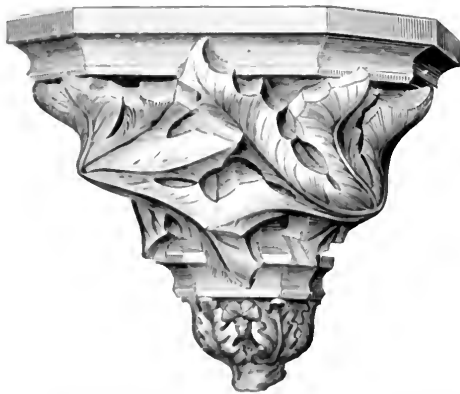


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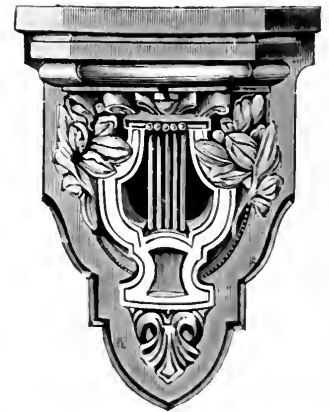
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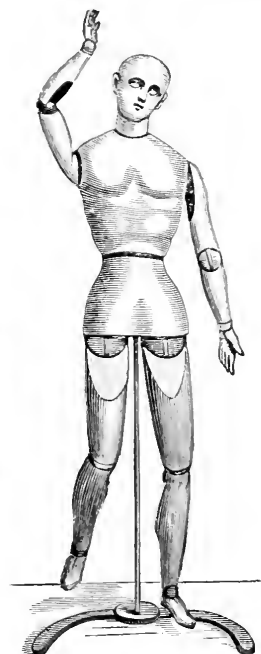
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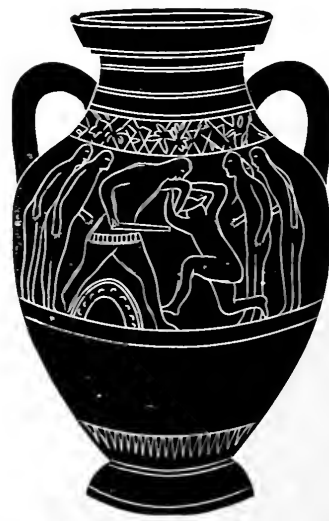
No. 3961—8 in. ... \$1.00

AMPHORA.



No. 3962—8 in. ... \$1.00

GREEK AMPHORA.



No. 3963—10 in. ... \$1.50

HYDRIA.

HYDRIA.



No. 3964—10 in. ... \$1.25

GREEK AMPHORA.
Panathenaic.

No. 3965—9 in. ... \$1.00

LEKYTHO-AMPHORA.



No. 3966—9 in. ... \$1.00



No. 3967—9 in. ... \$1.25

LEPASTE.



No. 3969—5 in. ... \$1.00

GREEK KRATER.



No. 3968—9 in. ... \$1.25

KYLIX.



No. 3970—5 in. ... \$1.00

KRATER.



No. 3971—9 in. ... \$1.25

In some of the Vases, the more exposed handles are cast in metal, which is covered uniformly with the rest.

LECYTHUS.



No. 3972—12 in... \$1.25

Please do not cut this Book in making orders.

LEBES.



No. 3973—10 in... \$1.25

OENOCHOE.



No. 3974—10 in... \$1.25

PROCHOUS.



No. 3975—10 in... \$1.00

ETRUSCAN VASE.



No. 3977—7½ in... \$1.25

CANTHARUS.



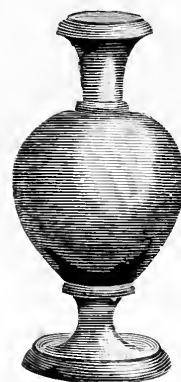
No. 3978—8 in... \$1.25

LECYTHUS.



No. 3976—10 in... \$1.00

MODERN.



No. 3982—10 in... \$1.00

GREEK.



No. 3979—10½ in... \$1.00

ARYBALLUS.



No. 3980—9 in... \$1.00

LEBES.



No. 3981—9 in... \$1.00

GREEK VASE.



No. 3983—10 in... \$1.00

GREEK JUG.



No. 3984—8 in... .75c.

GREEK.



No. 3985—8 in... .75c.

ANCIENT JUG.



No. 3986—7 in... .75c.

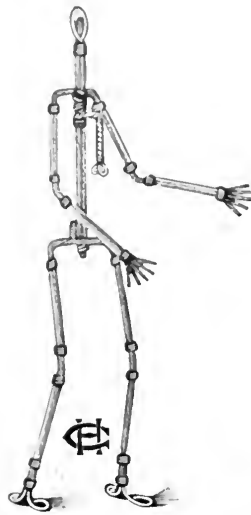
MODERN.



No. 3987—10 in... \$1.25

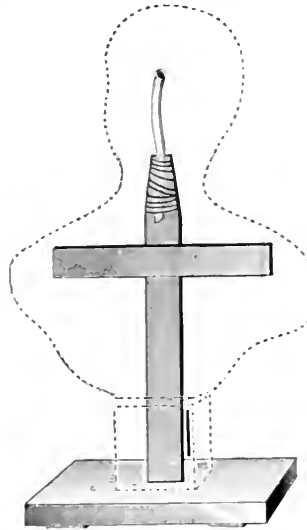
C. HENNECKE CO. MILWAUKEE AND CHICAGO.

WIRE STATUE SUPPORT.



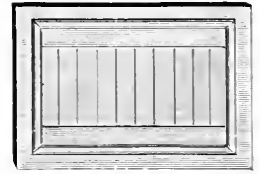
No. 3990.

BUST SUPPORT.



No. 3991.

MODELING BOARD.



No. 4003—15 x 13 in. . . . \$2.60

MODELING STAND FOR WORK IN RELIEF.



No. 4004—Hgt., 12 in.; base, 14 x 11 in.; top, 14 x 13 in. . . . \$2.25

MODELING STAND.

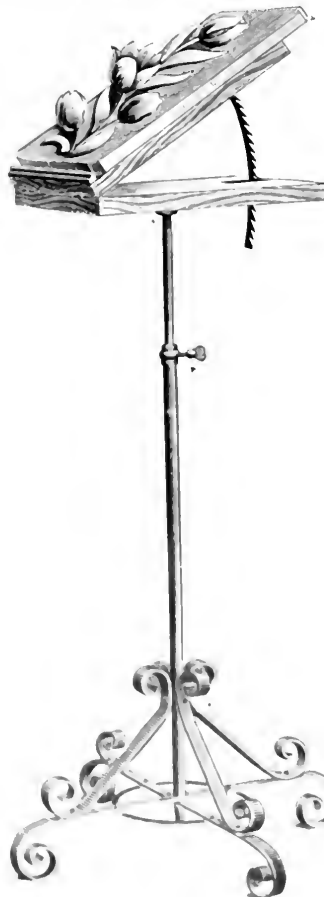
For Busts and Statues, with revolving top.



No. 4005—Hgt., 50 in.; top, 15 in. . . . \$4.00
" 3988—with a screw column, can be extended 3½ ft. to 4½ ft.

ADJUSTABLE COMBINATION STAND.

For modeling, drawing, placing drawing models, on, etc. It can be extended from 3 ft. to 6 ft. It is made of wrought iron, except the top, which is wood, and 14 x 13 inches.



No. 3993—Stand only . . . \$6.00



No. 3990—Stand only . . . \$6.00

EASEL FOR SUPPORTING MODELING BOARD.



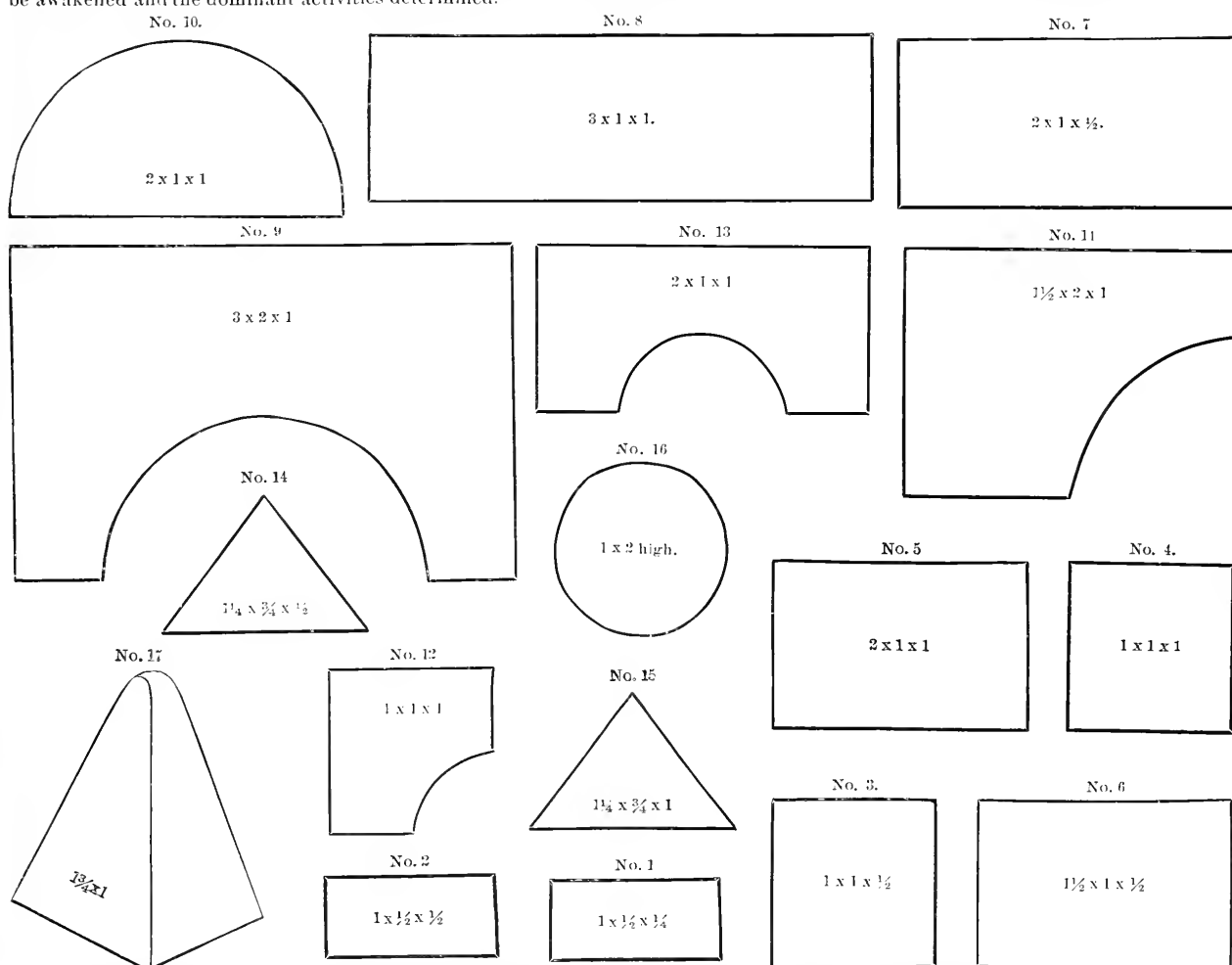
No. 4006—Hgt., 66 in.; width at base, 33 in. . . . \$3.25

No. 3989—18 x 7 in. easel only. 60c.

Will hold a plaque 18 x 16 in.

KINDERGARTEN BRICK AND BUILDING BLOCKS.

After studying the various activities of children, Froebel arrives at the conclusion that "play is the natural, the appropriate business and occupation of the child left to his own resources. The child that does not play is not a perfect child." Here, then, we have a philosopher's statement that play is appointed as a means of developing the powers of the child; it teaches them to observe, to invent, to construct. Concerning the latter he says, "I see that they invent and construct; but often awkwardly and aimlessly. I can avail myself of this instinct, and open to it a definite field of action. I shall prompt them to invention, and train them in the art of construction. The materials I shall use for this end will be simple; but in combining them together for a purpose, they will employ not only their knowledge of form, but their imagination of the capabilities of form. In various ways I shall prompt them to invent, construct, contrive, imitate, and in doing so develop their nascent taste for symmetry and beauty. And so in respect to other domains of that child-action which we call play, I see that I can make these domains also my own. I can convert children's activities, energies, amusements, occupations, all that goes by the name of play, into instruments for my purpose, and, therefore, transform play into work. This work will be education in the true sense of the term." And when Froebel came to reduce his theory to practice, he devised many processes to represent the principles he advocated, among them practising the senses of the child with a definite purpose; teaching it to observe the properties of objects; counting; getting notions of form and color; drawing; building with cubical blocks; modeling in wax or clay, etc. What more interesting and profitable exercise to the child than the building blocks afford, could we desire? The shape of each block is a study. But what an exercise for its inventive faculty! It will build and tear down again, rearrange them in a new way and after a brief enjoyment of the structure, think of a better way in which it can be built; and the house, church or bridge is razed or broken down and an improved building erected. The separate pieces are all carefully scanned with reference to their fitness in a certain position; the number necessary is determined and the counting of the bricks on hand, of spandrels and arches ready for use; the whole performance of the child showing a seriousness, an intenseness of interest and application that cannot but aid the whole mental growth of the child. And shall we withhold from the child such simple means for his education? Should not every household be supplied with a box of geometric solids and planes, building blocks, paste-board and scissors, paper for folding and cutting, clay and wax for modeling? Then if no kindergarten is near where the child can attend, it has a few of the materials at hand through which it can gain entrance to the world of facts and form; by means of which its slumbering faculties can be awakened and the dominant activities determined.



The above diagrams show the exact shape and size of our Kindergarten Bricks. To place them within the reach of all, we offer them at the very low rate of \$1.00 a box; they are assorted as per list given below and packed in neat boxes. By the use of these blocks a child can build houses, churches, crosses, steps, columns, bridges, etc., in a numberless variety of styles.

ASSORTED BOX KINDERGARTEN BRICKS.

No. 1—Number of brick in box.....12	No. 7—Number of brick in box.....20	No. 13—Number of brick in box.....1
" 2— " " " ".....8	" 8— " " " ".....4	" 14— " " " ".....2
" 3— " " " ".....8	" 9— " " " ".....1	" 15— " " " ".....2
" 4— " " " ".....4	" 10— " " " ".....1	" 16— " " " ".....2
" 5— " " " ".....2	" 11— " " " ".....2	" 17— " " " ".....2
" 6— " " " ".....2	" 12— " " " ".....2	

Total number in box, 75, price, \$1.00.

Special prices in large quantities.

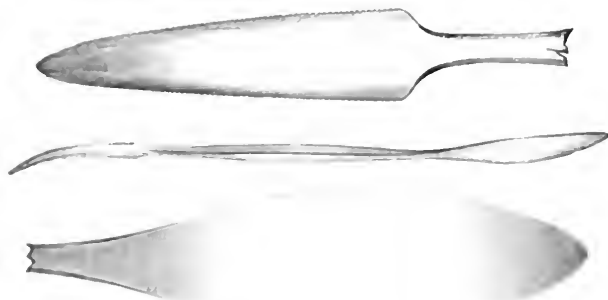
No. 4034—Froebel Monument, Cube, Cylinder and Ball, height, 12 $\frac{1}{2}$ in. . . \$1.00
 No. 4035—Froebel Bust, height, 28 in. . . \$8.00. No. 4036—Froebel Bust, height, 16 in. . . \$3.00.

Hennecke's Modeling Tools, are made of polished boxwood, and are the most practical tools made. By looking at the full size sectional views, you will observe that the 8 make 16 distinct tools. We will send sample set of 8 tools, post paid, for £3.00.

Modeling tools made of any other material than boxwood, coconut ebony or bone, will not work satisfactorily because they "drag" the clay.



STEEL MODELING TOOLS.



To form a correct idea of the size and shape of the Modeling Tools we have added full size of sectional ends, except in Nos. 4009 and 4010, which admitted giving size in figures.



No. 4016--8 in ...per doz., \$4.50

No. 4017-10 in....	per doz.,	\$6.00
" 4018-12 in....	"	7.29



No. 1620—9 in., . . . per doz., \$9.00

Concave on one side and convex on the other side.



No. 1026	5 in. long	each, \$.60
" 1027	7 in. " "	" .80

H. 10000 lbs. Prepared Moulding Clay, of a light stone color, brings out light and shade to perfection, is very pleasing to the eye, and is so prepared that it will shrink and never cracks when properly used; after once trying our prepared clay you will never use another on the premises. It is the best that is charged for common clay, and it is far superior. The clay can be used over and over again, and it is so prepared that it will keep in the best condition for a long time. If it is too dry add water, but knead thoroughly, if too wet then dry it. To make it so that it will keep in the best condition for a long time, keep it in a covered earthen jar, cover the entire lid with a coarse woolen cloth, and keep it in a cool place, and it will keep in the best condition for a long time. It will keep in the best condition for a long time, and it will keep in the best condition for a long time.

S. 10000 lbs. Prepared Moulding Clay, of a light stone color, brings out light and shade to perfection, is very pleasing to the eye, and is so prepared that it will shrink and never cracks when properly used; after once trying our prepared clay you will never use another on the premises. It is the best that is charged for common clay, and it is far superior. The clay can be used over and over again, and it is so prepared that it will keep in the best condition for a long time. If it is too dry add water, but knead thoroughly, if too wet then dry it. To make it so that it will keep in the best condition for a long time, keep it in a covered earthen jar, cover the entire lid with a coarse woolen cloth, and keep it in a cool place, and it will keep in the best condition for a long time. It will keep in the best condition for a long time, and it will keep in the best condition for a long time.

S. 10000 lbs. Prepared Moulding Clay, of a light stone color, brings out light and shade to perfection, is very pleasing to the eye, and is so prepared that it will shrink and never cracks when properly used; after once trying our prepared clay you will never use another on the premises. It is the best that is charged for common clay, and it is far superior. The clay can be used over and over again, and it is so prepared that it will keep in the best condition for a long time. If it is too dry add water, but knead thoroughly, if too wet then dry it. To make it so that it will keep in the best condition for a long time, keep it in a covered earthen jar, cover the entire lid with a coarse woolen cloth, and keep it in a cool place, and it will keep in the best condition for a long time. It will keep in the best condition for a long time, and it will keep in the best condition for a long time.

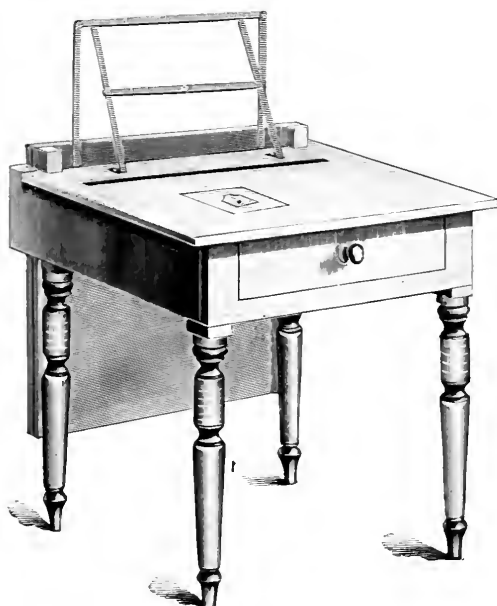
CLASSICAL STATUARY, BUSTS AND MODELS

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ATOMIZER FOR MOISTENING CLAY.



No. 4021....\$1.00



No. 4022

No. 4022 Combined Modeling and Drawing Table, price \$6.00. This does not include the Drawing Board. Height of table 30 in., length, 26 in., depth 24 in. Other sizes made to order. This table has a drawer for tools, clay, etc.; also a small drawer in same to receive any waste clay on top of desk through the cover fitting close in top of table. The drawing board when not in use can be put in its place as shown in illustration in a second. The easel to place casts and drawings against can be folded, and drops down through an opening between the table and drawing board at pleasure.

MODEL DRAWING.

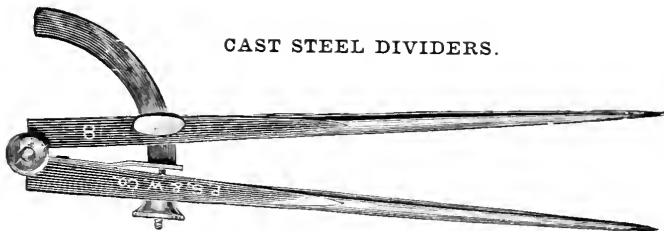
A valuable book for teachers and for self-instruction, containing the Elementary Principles of Drawing from solid forms with 20 single and 6 double-page plates. Cloth, \$1.25, post paid. This book contains a course of lessons designed to teach the elements of Model Drawing and Perspective, and to encourage drawing from the objects instead of from copies. The latter is considered by the foremost educators in all countries a waste of time, yields no results, and deadens the interest in the study of Art. "It is not the shadows of things, but the things themselves, which should be presented to youth."

PLASTINA.

A New Plastic Material for the Use of Sculptors and Modelers.

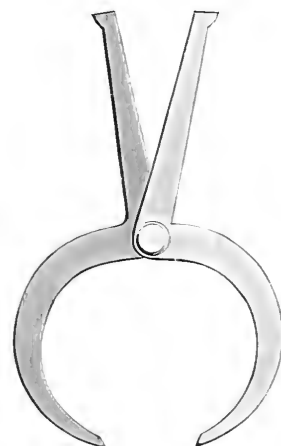
This new material does not get dry as is the case with clay, nor harden like wax, but always maintains its plasticity and softness. Plastina, not being soluble in water, will not adhere to chalk, nor lessen its cohesiveness when a cast is taken. It makes it possible to take the cast of any form without altering the smallest details of the model. In colossal models, where the great disadvantages inseparable from clay are more felt, the superior value of Plastina is shown, even better than in small models. With Plastina the largest models can be executed hollow; and as it contains no water that can evaporate at an ordinary temperature, it is not injurious to the health. Two precautions only are required, viz.: 1. To wrap the iron supports of models in paper. 2. To brush the mould with oil, instead of soap. Finally, Plastina, while excluding all the disadvantages of the modeling process connected with the use of clay, preserves and enhances all its advantages. Per lb. 60 cts.

CAST STEEL DIVIDERS.

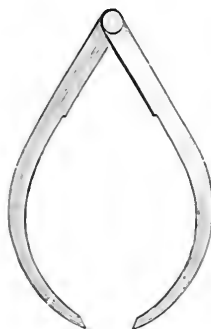


No. 4028 - 5 in.	.....each,	\$0 50
" 4029 - 7 in.	.....	.60
" 4030 - 9 in.	.....	.75
" 4031 - 12 in.	.....	1.00
" 4032 - 15 in.	.....	1 50
" 4033 - 18 in.	.....	2 00

DOUBLE CALIPERS.

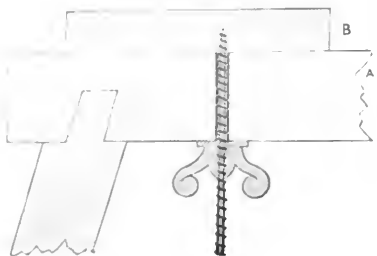


CALIPERS.

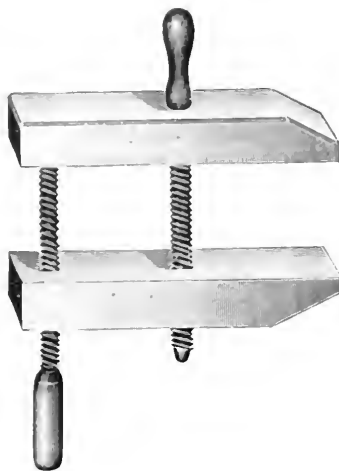


No. 4011 - 4 in.	.....each,	30c.
" 4012 - 6 in.	.....	40c.
" 4013 - 8 in.	.....	50c.

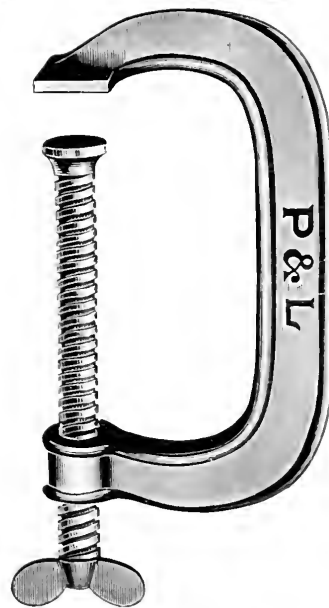
No. 4023 - 4 in.	.....	40c.
" 4024 - 5 in.	.....	50c.
" 4025 - 6 in.	.....	60c.



No. 4037—Section of Carvers' Table,
showing Screw.



No. 4041—Hand Screw... 10 in., 30c.
12 in., 40c. 14 in., 50c.



No. 4038—Clamp... 2½ in., 25c. 4 in., 45c. 6 in., 70c.



No. 4039—Oil Stone .. 40c.



No. 4040—Oil Stone in Mahogany Case .. \$1.00.

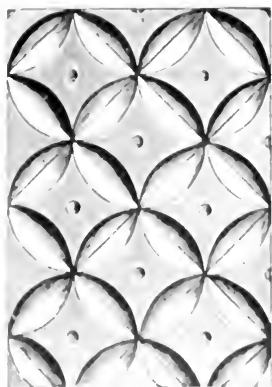


No. 4042—Carvers' Punch... 30c.



No. 4043—Knife used for Kerbschnitt, Blade, 2½ in... 50c.

Read preface before ordering.



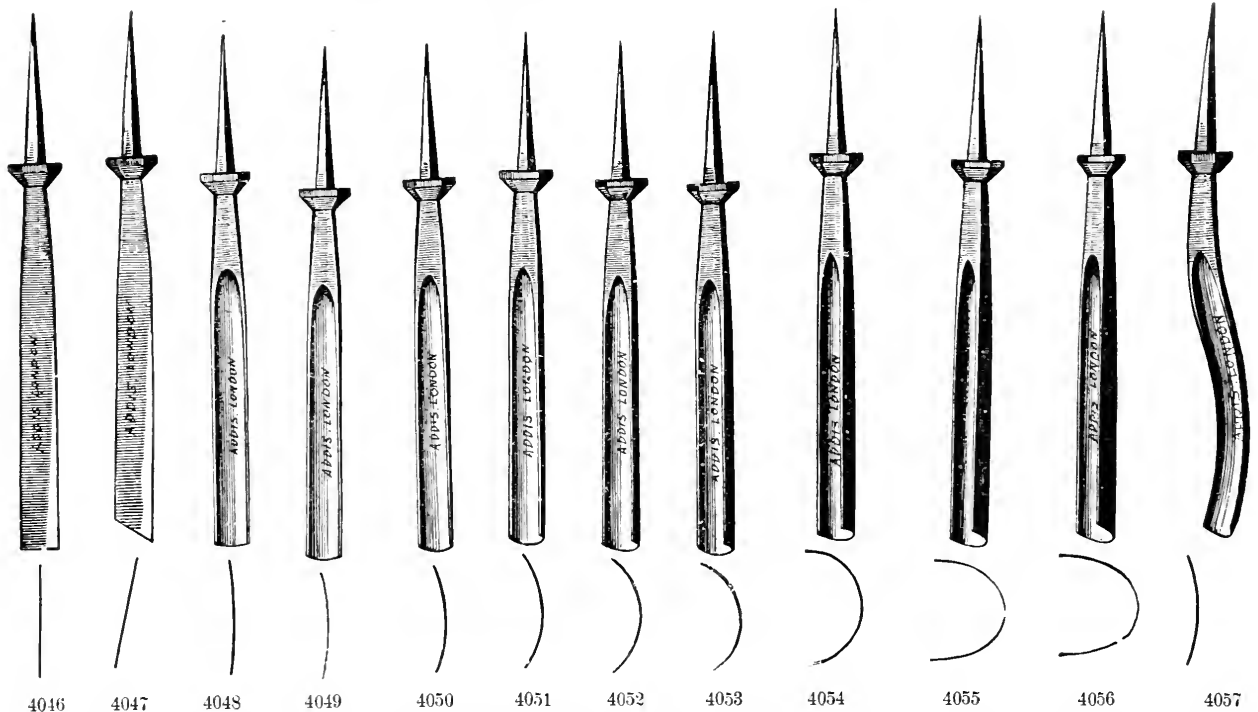
This illustration is a sample of Kerbschnitt described on page xlix.



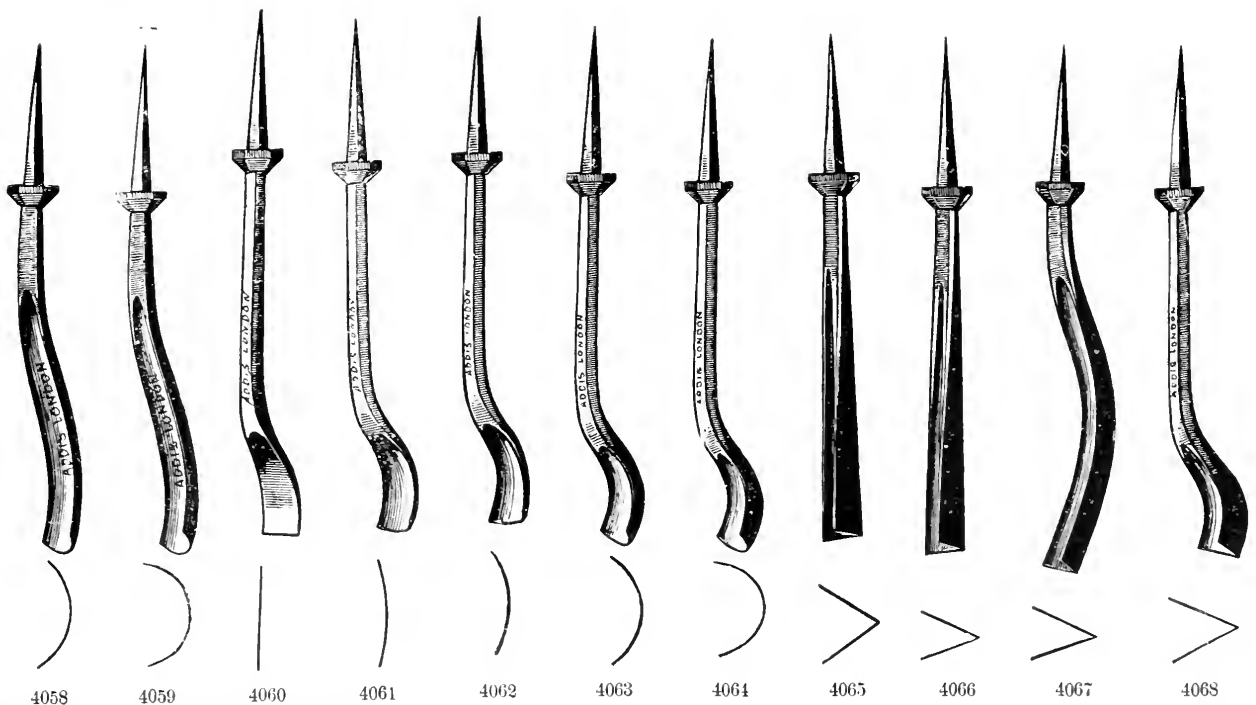
No. 4045—Set of Six Carving Tools ... \$1.50

These Tools are forged from best quality of Steel, and are sharpened ready for use. They have rosewood handles and are put up in walnut boxes.

ADDIS LONDON CARVING TOOLS.



Nos.	Inches. $1\frac{1}{2}$	Inches. $\frac{5}{8}$	Inches. $\frac{3}{4}$	Inches. $\frac{7}{8}$	Inches. 1	Inches. $1\frac{1}{4}$
	Per doz.	Per doz.	Per doz.	Per doz.	Per doz.	Per doz.
4046 and 4047	\$ 4 80	\$ 4 80	\$ 5 60	\$ 6 40	\$ 6 80	\$ 9 20
4048, 4049, 4050, 4051, 4052, 4053, 4054	5 60	5 60	6 60	7 40	7 80	10 80
4055	6 40	6 40	7 20	9 60	11 20	16 00
4056	6 40	7 20	9 60	11 20	12 80	19 20
4057 and 4058	6 80	6 80	7 60	10 40	12 00	16 00
4059	6 80	8 40	10 10	12 00	14 40	19 00
4060	6 00	6 00	6 00	8 40	10 10	14 40
4061, 4062, 4063	6 80	6 80	7 60	10 40	12 00	16 00
4064	6 80	8 40	10 10	12 00	14 40	19 20
4065 and 4066	8 40	10 10	13 00	16 40	20 40
4067 and 4068	9 20	11 20	13 80



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No.	Name.	Height, in.	Price.	No.	Name.	Height, in.	Price.
3000	Tetrahedron.....	5 $\frac{1}{2}$	30	3036	Flight of Three Steps.....	8	75
3001	".....	3 $\frac{1}{2}$	20	3037	Bolt and Nut.....	8	60
3002	Cube.....	7	60	3038	Prolate Spheroid.....	6 $\frac{1}{2}$	60
3003	".....	1	40	3039	Sheave.....	5	60
3004	Triangular Prism.....	10	60	3040	Bracket.....	10	75
3005	".....	6 $\frac{1}{2}$	40	3041	Double Cross.....	8	80
3006	Square Pyramid.....	10	60	3042	Ring, Annulet.....	8	60
3007	".....	7	40	3043	Oblong Slab with depression.....	9 $\frac{1}{2}$	50
3008	Oblique Pentagonal Pyramid.....	12	75	3044	Part of Ellipsoid, relief.....	8	40
3009	".....	8	40	3045	Oblong with beveled edges, relief.....	8	40
3010	Pentagonal Pyramid.....	10	60	3046	Divided Square Pyramid.....	8	40
3011	".....	7 $\frac{1}{2}$	40	3047	Cone in relief.....	8 $\frac{1}{2}$	40
3012	Hexagonal Pyramid.....	10	60	3048	Five-pointed Star.....	8	50
3013	".....	7	40	3049	Acorn in capsule.....	8	60
3014	Triangular Pyramid.....	10	60	3050	Battle-ax.....	8	70
3015	".....	7 $\frac{1}{2}$	40	3051	Part of Ellipsoid, relief and mould.....	11 $\frac{1}{2}$	Per pair, 75
3016	Hexagonal Prism.....	10	60	3052	Prismatic Crystal, relief and mould.....	8 $\frac{1}{2}$	75
3017	".....	6 $\frac{1}{2}$	40	3053	Cone, relief and mould.....	8 $\frac{1}{2}$	75
3018	Cone.....	11	60	3054	Ellipsoid, relief and mould.....	8 $\frac{1}{2}$	75
3019	".....	8	40	3055	Hexagonal Pyramid, relief and mould.....	8 $\frac{1}{2}$	75
3020	Cylinder.....	10	60	3056	Hemisphere, relief and mould.....	8 $\frac{1}{2}$	75
3021	".....	4	30	3057	Nine Cubes on Slab.....	9	75
3022	".....	4	30	3058	Cross inside of Cube.....	9	80
3023	Cube with depression for sphere.....	7	60	3059	Ball Ornament.....	9	80
3024	".....	1	30	3060	Annulet and Drop.....	9	80
3025	Octahedron.....	8	60	3061	Cross with beveled edges (a).....	7 $\frac{1}{2}$	50
3026	".....	3 $\frac{1}{2}$	60	3062	Cup with Sphere.....	9	80
3027	Sphere.....	4	30	3063	Ring with Cone.....	9 $\frac{1}{2}$	80
3028	".....	4	30	3064	Cross with beveled edges (b).....	11	70
3029	Hexagonal Pyramid.....	6	60	3065	Eight pointed Star.....	9	80
3030	".....	7 $\frac{1}{2}$	60	3066	Gothic Quatrefoil (a).....	7 $\frac{1}{2}$	50
3031	".....	6	40	3067	" " Trefoil.....	7 $\frac{1}{2}$	50
3032	".....	8	60	3068	" " Rosette, Wood Carving from choir stall at Maulbronn.....	8	50
3033	".....	8	60	3069	Six pointed Star, mould and relief.....	5	Per pair, 75
3034	".....	8	60	3070	Gothic Quatrefoil (b).....	7 $\frac{1}{2}$	50
3035	".....	12	1.75				

CLASSICAL STATUARY. BUSTS AND MODELS.

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No.	Name.	Height, in.	Price.	No.	Name.	Height, in.	Price.
3071—	Octagon, relief and mould.	7 $\frac{1}{2}$	Per pair, 75	3158—	Dandelion Leaf, natural	20 $\frac{1}{2}$	1 30
3072—	Conventional Ivy Leaf.	9 $\frac{1}{2}$	75	3159—	Thistle Leaf, natural	19	1 30
3073—	Leaf Form	9 $\frac{1}{2}$	80	3160—	Ornament, Renaissance	19 $\frac{1}{2}$	2 25
3074—	Annuet and Sphere	8	60	3161—	Leaf Form	13	1 25
3075—	Rosette, From choir stall at Maulbronn.	8	50	3162—	Modern Scroll Ornament.	17 $\frac{1}{2}$	1 25
3076—	Conventional Fig Leaf Ornament.	8	75	3163—	Lizard	5	25
3077—	Band Ornament.	8 $\frac{1}{2}$	60	3164—	Frog	5	35
3078—	Carving, Elizabethan Ornament.	8 $\frac{1}{2}$	60	3165—	Water Adder.	15	1 25
3079—	Octofoil.	9	75	3166—	Strawberry Leaf.	5 $\frac{1}{2}$	40
3080—	Conventional Leaf Form.	9 $\frac{1}{2}$	75	3167—	British Oak Leaf.	18	1 75
3081—	"	9 $\frac{1}{2}$	75	3168—	Rose Leaf.	7 $\frac{1}{2}$	60
3082—	Moulding	8 $\frac{1}{2}$	60	3169—	Ornament, Grapes, Leaves and Fruit.	22	2 50
3083—	Palmetto Ornament (a)	9 $\frac{1}{2}$	60	3170—	Lotus Ornament.	21	2 75
3084—	" (b)	9 $\frac{1}{2}$	60	3171—	Scroll Ornament, Leaf, Bud and Fruit	22	2 50
3085—	Leaf Ornament.	9 $\frac{1}{2}$	60	3172—	Burdock Leaf (natural), obverse	16 $\frac{1}{2}$	1 30
3086—	Conventional Bud and Leaf Ornament (a)	9 $\frac{1}{2}$	60	3173—	Geranium and Aconitum Leaves (natural)	11 $\frac{1}{2}$	90
3087—	" (b)	9 $\frac{1}{2}$	80	3174—	Burdock Leaf (natural), reverse	16 $\frac{1}{2}$	1 30
3088—	Acanthus Leaf.	12	1 00	3175—	Chestnut Leaf.	16	1 75
3089—	Conventional Leaf Ornament.	12	80	3176—	Acanthus Leaf, from a Roman can-		
3090—	" " "	9 $\frac{1}{2}$	80	delabra.		23	1 75
3091—	" " "	12	75	3177—	Chestnut Leaf.	20	3 00
3092—	" Flower.	9 $\frac{1}{2}$	90	3178—	Leaf Ornament, Renaissance.	24	2 25
3093—	" " "	9 $\frac{1}{2}$	1 00	3179—	Apples, sprig.	13	90
3094—	" " "	9 $\frac{1}{2}$	90	3180—	Apples, small sprig.	12	1 00
3095—	" Rose (a).	9	90	3181—	Pomegranates, sprig.	17	1 25
3096—	" Flower.	9	75	3182—	Pears, sprig.	11 $\frac{1}{2}$	1 00
3097—	" Rose (b).	9	75	3183—	" " large.	11 $\frac{1}{2}$	1 00
3098—	" Flower	9	75	3184—	Apples, sprig.	11	1 00
3099—	" Ornament, Fragment of			3185—	Figs, sprig.	17 $\frac{1}{2}$	1 25
	Roman Frieze	15 $\frac{1}{2}$	2 50	3186—	Apples, sprig.	14	1 00
3100—	Conventional Flower.	9	90	3187—	Quince, sprig.	18 $\frac{1}{2}$	1 25
3101—	" " Pond Lily.	9	80	3188—	Pears, sprig.	14	1 25
3102—	" Palm Leaf.	8	60	3189—	Crab Apples, sprig.	14 $\frac{1}{2}$	1 00
3103—	Arum Leaf, natural	5 $\frac{1}{2}$	60	3190—	Peaches, sprigs.	17 $\frac{1}{2}$	1 25
3104—	Conventional Fig Leaf.	7	40	3191—	Oranges, sprig.	12	1 00
3105—	" Leaf.	9 $\frac{1}{2}$	60	3192—	Grapes and Lizard.	15	1 50
3106—	" Flower	9	75	3193—	Figs, sprig.	11 $\frac{1}{2}$	1 00
3107—	" Leaf.	9	60	3194—	Pears, sprig.	17 $\frac{1}{2}$	1 50
3108—	" Rose Leaf.	9	60	3195—	Geranium Leaf.	10	75
3109—	Architectural Ornament.	11	50	3196—	Grape Sprig.	10 $\frac{1}{2}$	75
3110—	" " "	10 $\frac{1}{2}$	60	3197—	Grapes.	17 $\frac{1}{2}$	1 25
3111—	Conventional Leaf.	10	75	3198—	Bouquet of Roses, Daisies and Lilies.	10 $\frac{1}{2}$	1 00
3112—	Egyptian Lotus Leaf and Buds.	10 $\frac{1}{2}$	60	3199—	Arum Lily and Leaf.	9 $\frac{1}{2}$	75
3113—	Conventional Palm Leaf.	10	60	3200—	Bouquet of Roses and Carnations	10 $\frac{1}{2}$	1 00
3114—	" Clover Leaf.	10	50	3201—	Tulip.	14	1 00
3115—	" Fig Leaf.	7 $\frac{1}{2}$	50	3202—	Grapes and Birds.	10 $\frac{1}{2}$	1 00
3116—	Acanthus Leaf.	12	75	3203—	Rose Spray.	11	1 00
3117—	Roman ornament, Honeysuckle.	17 $\frac{1}{2}$	1 25	3204—	Tiger Lily.	17 $\frac{1}{2}$	1 25
3118—	Bud	11 $\frac{1}{2}$	90	3205—	Faith, Hope and Charity.	27	3 00
3119—	Leaf Ornament, Modern.	12	1 00	3206—	Sunflower.	17 $\frac{1}{2}$	1 25
3120—	Bud of Poppy.	9	75	3207—	Spray of Roses.	17 $\frac{1}{2}$	1 25
3121—	Indian Corn, Conventionalized	12	1 25	3208—	Convolvulus.	12	1 00
3122—	Ornament, Fragment of Roman Frieze.	17	2 00	3209—	Tulip.	18	1 25
3123—	Conventional Sprig.	12	90	3210—	Hollyhock.	17 $\frac{1}{2}$	1 25
3124—	Ornament, Fragment of Roman Frieze.	19	2 50	3211—	Roses and Fuchsia.	23	2 50
3125—	Roman Acanthus Ornament.	15 $\frac{1}{2}$	1 25	3212—	Daisies, Poppies and Pansies.	17 $\frac{1}{2}$	1 25
3126—	Conventional Leaf Form.	12	75	3213—	Pond Lily.	15	1 50
3127—	Pear	7	50	3214—	Poppy.	25	2 75
3128—	Orange	7	50	3215—	Egyptian Lily.	15 $\frac{1}{2}$	1 50
3129—	"	7	50	3216—	Acanthus Leaf, Italian Renaissance.	22 $\frac{1}{2}$	2 75
3130—	Lemon.	7	50	3217—	Sepulchral Monument, Italian Renais-		
3131—	Citron	7	50	sance, in three sections.		34	5 00
3132—	Quince.	7	50	3218—	Leaf Ornament, Renaissance.	12	90
3133—	Pomegranate.	7	50	3219—	Scroll Ornament, Modern Renaissance.	12	90
3134—	Apple.	7	50	3220—	Ornament, Modern Renaissance.	12	80
3135—	Potato.	7	50	3221—	" " "	16	1 25
3136—	Cocoanut.	7	50	3222—	" " "	21 $\frac{1}{2}$	2 25
3137—	Conventional Leaf.	12	75	3223—	" " "	16	1 25
3138—	Palm Leaf Scroll Ornament.	10 $\frac{1}{2}$	90	3224—	Oak Leaf Ornament, Modern Renais-		
3139—	Conventional Ornament.	12	90	sance.		21 $\frac{1}{2}$	2 25
3140—	Scroll Ornament.	12 $\frac{1}{2}$	1 20	3225—	Ornament, Italian Renaissance.	22	2 50
3141—	Leaf Ornament.	12	80	3226—	Acanthus Leaf Ornament, Italian Re-		
3142—	Architectural Ornament.	10 $\frac{1}{2}$	90	naisance.		17	1 25
3143—	Modern Ornament, Scroll.	12	1 00	3227—	Scroll Ornament, Modern Renaissance.	17	1 50
3144—	Natural Leaf.	12	1 00	3228—	Oak Leaf Ornament, Modern Renais-		
3145—	Hop Leaves.	11 $\frac{1}{2}$	1 00	sance.		22	2 25
3146—	Natural Leaf Form.	9	60	3229—	Conventional Ornament, Modern.	22	2 25
3147—	Oak Leaf.	10	75	3230—	Rose Rosette.	14	2 25
3148—	Virginia Creeper, reverse.	14	1 50	3231—	Greek Anthemion, Antefix to Parthenon.	20 $\frac{1}{2}$	2 75
3149—	" obverse.	14	1 50	3232—	Rosette, Roman	14	2 25
3150—	Currant Leaf.	8 $\frac{1}{2}$	60	3233—	Rosette, from Fragment from Villa		
3151—	Chestnut Leaf.	11 $\frac{1}{2}$	90	Medici, Rome		14	2 25
3152—	Twig of Oak.	16 $\frac{1}{2}$	1 25	3234—	Thistle Bracket.	15	1 25
3153—	Geranium Leaf.	9 $\frac{1}{2}$	60	3235—	Carved Leaf Ornament, from choir		
3154—	Bouquet Bracket.	13	1 25	stall at Maulbronn, Early Gothic.		12	2 00
3155—	Canna Leaf, natural.	15 $\frac{1}{2}$	1 25	3236—	Rosette.	14	2 25
3156—	Plantain Leaf, natural.	17 $\frac{1}{2}$	1 30	3237—	Greek Ornament.	15 $\frac{1}{2}$	2 00
3157—	Ornament from Trajan Column.	23	3 00	3238—	Rosette from Pilaster, Villa Medici-Rome	12	2 25

No.	Name.	Height, in.	Price.	No.	Name.	Height, in.	Price.
3239	Bracket, Modern.....	29	2 50	3311	Capital from Temple Church, London, Gothic.....	15½	2 50
3240	Grape Leaf Scroll, relief carving.....	17	2 50	3312	Capital from Stone Church in Kent, Gothic.....	17½	4 00
3241	Gothic Rose Window.....	8½	1 00	3313	" " Italian Renaissance.....	18	1 50
3242	" " " ".....	8½	1 00	3314	" " " ".....	18	4 00
3243	" " " ".....	8½	1 00	3315	" " " ".....	14½	2 50
3244	Ornament, piece of Wood Carving, Modern Renaissance.....	25	2 75	3316	" " Byzantine.....	8	1 25
3245	Vase by Leonard, Paris.....	22	3 50	3317	Griffin.....	18	1 75
3246	Gothic Rose Window.....	10	1 50	3318	" " " ".....	18	1 75
3247	Moulding.....	11	80	3319	Gothic Panel, from Church in Bonn.....	21	3 50
3248	Echini with Pearl Beading.....	11	80	3320	Fragment from the Erechtheum.....	26	3 50
3249	Leaf Scroll Ornament, Renaissance.....	17	1 25	3321	Roman Acanthus Ornament, from the Palace Mattei, Rome.....	23	3 00
3250	" " " ".....	12	90	3322	Bas-relief from Church St. Maria dei Miracoli—Italian Renaissance.....	24	3 75
3251	" " " ".....	17	1 25	3323	Greek Moulding.....	28	2 75
3252	Greek Fret Moulding.....	11	80	3324	Ornament from the Villa Medici, Rome.....	33	3 50
3253	Scroll Ornament, Moulding.....	11	80	3325	Fragment of a Roman Frieze, in three sections.....	40	4 00
3254	Acanthus Leaf Moulding.....	11	80	3326	Fragment of an Ancient Roman Frieze, in three sections.....	40	4 50
3255	Moulding.....	11	80	3327	Roman Acanthus Leaf Ornament.....	25	3 00
3256	Gilloche Moulding.....	11	80	3328	" " " ".....	19	2 50
3257	Leaf bud on ogee moulding, Lesbian cymatium.....	11	80	3329	From the Gates of the Baptistery, Florence, by Lorenzo Ghiberti, in three sections.....	38	3 50
3258	Double Twist.....	11	80	3330	Hand, open.....	10	1 25
3259	Moulding, with Leaf and Rosette.....	11	80	3331	Hand, holding scroll.....	12	1 25
3260	Moulding, with Spray of Flowers.....	11	80	3332	Hand of Female.....	9	90
3261	Flower and Fruit Moulding.....	11	80	3333	Hand of Male.....	12	1 25
3262	Relief, St. John, by Donatello.....	21	3 50	3334	Arm and Hand of Child.....	10	90
3263	Wreath.....	16	1 75	3335	Hand of Child.....	6	50
3264	Relief, St. Cecilia, by Donatello.....	21	4 00	3336	" " " ".....	7	50
3265	" " " ".....	9	1 00	3337	Right Female Hand, with pen.....	11	1 00
3266	Boy Musicians, Relief by Luca Della Robbia.....	11	1 50	3338	Hand.....	11	1 25
3266-1	Boy Musicians, Relief by Luca Della Robbia.....	41½	18 00	3339	Hand, grasping staff.....	10	1 00
3267	Singing Boys, Relief by Luca Della Robbia.....	20	4 50	3340	Upturned closed Hand.....	9	1 00
3267-1	" " " ".....	40½	12 00	3341	Right Hand of Infant.....	6	50
3267-2	" " " " with Scroll, Relief by Luca Della Robbia.....	40½	12 00	3342	Left Hand of Girl.....	5	50
3267-3	Singing Boys, with Scroll, Relief by Luca Della Robbia.....	20	4 50	3343	Hand of Infant, left.....	7	50
3268	Playing and Dancing Boys, Relief by Luca Della Robbia.....	11	1 50	3344	Boy's Hand, left.....	8	80
3268-1	Playing and Dancing Boys, Relief by Luca Della Robbia.....	41½	18 00	3345	Right Hand of Youth.....	11	1 00
3269	Spring, by Pignoli, Paris.....	18	2 50	3346	Child's Hands crossed.....	5½	90
3270	Symphony, by Ernst Haeckel.....	17	3 00	3347	Girl's Left Hand.....	10	1 00
3271	Autumn, by Pignoli, Paris.....	18	2 50	3348	Left Male Hand, with fingers turned inward.....	10	1 25
3272	Summer, by Robbia.....	10	75	3349	Boy's Fist.....	7	60
3273	Cupids, by Francois du Quesnoy, (Il Flamingo).....	39	6 00	3350	Child's Hand, grasping apple.....	5	50
3274	(Given as No. 3247)—Winter, by Robbia.....	10	75	3351	" " " " rod.....	5	50
3275	Owl, Night.....	26	1 50	3352	Left Hand of Youth, grasping rod.....	7	60
3276	Spring, by Robbia.....	10	75	3353	Right Hand of Male, " ".....	12	1 50
3277	Autumn, " ".....	10	75	3354	Right Hand of Infant, " foot.....	6	75
3278	Owl, Day.....	26	1 50	3355	Right Hand, pointing.....	11	1 00
3279	Stork, Panel (a).....	25	1 50	3356	Hands placed upon each other.....	10	1 25
3280	Game.....	20	2 50	3357	Left Hand grasping lightly.....	12	1 25
3281	Fish.....	20	2 50	3358	Right Arm of Child, placed on breast.....	8	1 25
3282	Stork, Panel (b).....	25	1 50	3359	Left Hand of Girl.....	12	1 00
3283	Moorish Ornament from the Alhambra.....	16	1 50	3360	Right Hand of Youth grasping rod.....	15	1 25
3284	" " " ".....	15½	1 50	3361	Child's Hand.....	6	50
3285	" " " ".....	15½	1 50	3362	Right Hand holding marble between thumb and second finger.....	12	1 25
3286	Silver Drinking Cup, German.....	8½	1 50	3363	Male Hand, held upright.....	16	2 00
3287	Moorish Ornament from the Alhambra.....	15½	1 50	3364	Right Hand, anatomical.....	11	1 00
3288	Vase de Medici.....	16	3 00	3365	Left Hand of Youth, grasping stone.....	12	1 25
3289	Modern Vase.....	16	3 00	3366	Left Hand of Boy.....	10	1 25
3290	Cellini Vase.....	18	3 00	3367	Hand of Child, open.....	6	50
3291	Modern Vase.....	16	3 00	3368	Right Hand.....	12	1 25
3292	Grotesque, Modern Wood Carving.....	22	3 00	3369	Female Hand, arm raised.....	9½	1 50
3293	Encarpi, Wreath.....	17½	1 25	3370	Boy's Hand.....	7½	75
3294	Ornament, Wood Carving, Panel.....	25	2 50	3371	Female Hands, crossed.....	12	1 20
3295	Fragment from Roman Frieze.....	30	3 50	3372	Left Hand, grasping rod.....	12	1 25
3296	Grotesque, Italian Renaissance.....	17½	1 50	3373	Grasping Hands, Youth and Infant.....	8	1 50
3297	Ornament from Frieze Notre Dame, Paris.....	39	3 50	3374	Right Hand of Child.....	10	90
3298	Ornament, Wood Carving, Renaissance.....	26	3 00	3375	Hand holding Apple, upright position.....	12	1 50
3299	Entablature and Capital, Composite order.....	19	3 75	3376	Left Hand, placed on open book.....	12	1 50
3300	" " " " Corinthian.....	19	3 75	3377	Left Hand, without book.....	10	1 00
3301	" " " " Doric.....	16	3 75	3378	Clasped Hands of Child.....	6	1 00
3302	Base and Pedestal, Composite order.....	18	3 75	3379	Left Female Arm, bent.....	33	2 50
3303	" " " " Corinthian.....	18	3 75	3380	Right Female Arm, hand grasping.....	27	2 50
3304	" " " " Doric.....	16	3 75	3381	Right Female Hand.....	13	1 00
3305	Entablature and Capital, Ionic order.....	16	3 75	3382	Hand, holding pencil.....	8	75
3306	Base and Pedestal, Ionic order.....	16	3 75	3383	Clasped Hands.....	7	1 25
3307	Entablature and Capital, Tuscan order.....	16	3 75	3384	Boy's Hand and Fore Arm.....	11	1 00
3308	Base and Pedestal, " ".....	16	3 75	3385	Child's Hand.....	6	50
3309	Capital, from Portal St. Maria de Muratoli, Venice—Italian Renaissance.....	18	1 00	3386	Infant's Hand, closed.....	5	50
3310	Capital of Pilaster, Palace Vecchio, Florence—Italian Renaissance.....	11	2 00	3387	Clasped Hands of Infant.....	5	50
				3388	Right Female Hand.....	8½	1 00
				3389	Left Female Hand.....	10½	1 00

CLASSICAL STATUARY. BUSTS AND MODELS.

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No.	Name.	Height, in.	Price.	No.	Name	Height, in.	Price.
3390—	Right Hand, holding pencil.....	8	75	3473—	Head of Child, (b).....	8	1 25
3391—	Left Hand, bent at wrist.....	8	80	3474—	" " (c).....	9	1 25
3392—	Upturned Child's Hand.....	5	50	3475—	Group of Infant Heads.....	20	3 50
3393—	Left Hand, placed on wrist of right hand.....	11	1 50	3476—	Head of Child, (d).....	9	1 25
3394—	Right Female Arm, hand upturned.....	27	2 00	3477—	" " (e).....	10	1 50
3395—	Male Hand, grasping female hand.....	13	1 50	3478—	Head of St. John, from the 'Crucifixion'		
3396—	Arm of Youth, bent.....	30	2 00	by Rubens.....	14	2 00	
3397—	Outstretched Right Arm of Youth.....	30	2 50	3479—	Head of Child, (f).....	11	1 50
3398—	Outstretched Right Arm of Youth, finger pointing.....	35	2 50	3480—	" " (g).....	9	1 50
3399—	Right Hand.....	13	1 80	3481—	" " (h).....	8	1 25
3400—	Left Arm of Female.....	18	1 50	3482—	Head of Child (i).....	9	1 25
3401—	Right Arm, showing layers of muscles.....	33	2 50	3483—	" " (j).....	10	1 50
3402—	Left Male Arm, placed against breast.....	17	4 00	3484—	Mask, Lorenzo de Medici.....	15	1 75
3403—	Hand of the Farnese Hercules.....	25	3 50	3485—	Relief, Marcus Antonius.....	9	1 00
3404—	Left Hand of Female.....	21	2 50	3486—	Mask, Female.....	8½	75
3405—	Child's Right Foot.....	6	60	3487—	Relief, Cyme, Queen of the Amazons.....	9½	75
3406—	Youth's Left Foot.....	9½	1 25	3488—	Eros Bust.....	15	75
3407—	Child's Left Leg.....	12	1 00	3489—	Head from Frieze of Hospital Pistoja.....	12	1 75
3408—	Foot of Child.....	5	50	3490—	Relief, Jeremias.....	14	2 00
3409—	Right Male Foot, heel raised.....	10	1 25	3491—	Head from Frieze of Hospital Pistoja.....	12	2 00
3410—	Right Foot of Youth.....	9½	1 25	3492—	Relief, Seneca.....	14	2 00
3411—	" " Boy.....	7½	1 00	3493—	Eschylus, Mask.....	14	1 50
3412—	Legs of Child.....	10	1 50	3494—	Augustus, ".....	13	1 00
3413—	Child's Leg, bent at knee.....	18	2 00	3495—	Ajax, ".....	18	2 00
3414—	Left Foot.....	10	1 00	3496—	Antinous, ".....	13	1 00
3415—	Infant Legs, crossed.....	17	2 50	3497—	Agrippa, ".....	15	1 50
3416—	Anatomical Leg.....	30	2 50	3498—	Caligula, ".....	19	2 00
3417—	Left Leg, heel raised.....	23	2 00	3499—	Canova, ".....	14	1 50
3418—	Anatomical Foot, right.....	10½	1 25	3500—	Christ, Mask, on Pedestal, by M. Angelo.....	24	5 00
3419—	Feet crossed.....	11	1 35	3501—	Cicero, ".....	14	1 25
3420—	Right Foot stretched forward.....	11	1 00	3502—	Clytie, ".....	14	1 50
3421—	Left Foot of Fighting Gladiator.....	13	2 00	3503—	Dante, ".....	9	1 00
3422—	Left Foot with heel raised.....	12	1 70	3504—	David, " by M. Angelo.....	20	5 00
3423—	Right Foot of Fighting Gladiator.....	13	2 00	3505—	" " " on Pedestal.....	30	10 00
3424—	Foot of Farnese Hercules.....	22	3 50	3506—	" " ".....	24	6 00
3425—	Right Foot of Male.....	12	1 50	3507—	Demosthenes, Mask.....	14	1 50
3426—	Foot from Apollo Belvidere, heel raised.....	13	2 00	3508—	Diana, ".....	15	1 25
3427—	" " ".....	13	2 00	3509—	Diomedes, ".....	16	1 50
3428—	Antique Foot, heel raised.....	15½	2 50	3510—	Discobolus, Naucydes, Mask.....	13	1 25
3429—	Eye.....	7	50	3511—	Dying Warrior, ".....	13	1 25
3430—	" ".....	8	50	3512—	Euripides, ".....	15	1 50
3431—	Mouth.....	5	40	3513—	Fighting Gladiator, ".....	16	1 50
3432—	Ear, colossal.....	6	50	3514—	Juliano De Medici, ".....	16	1 50
3433—	" ".....	7	60	3515—	Juno Capitol, ".....	13	1 00
3434—	Mouth.....	5	50	3516—	Jupiter, ".....	28	5 00
3435—	Eye.....	5	40	3517—	Madonna, ".....	14	1 50
3436—	Face, side view.....	9	1 50	3518—	Mercury, ".....	14	1 25
3437—	Mouth.....	5	40	3519—	Minerva, ".....	14	1 00
3438—	Right and Left Ear, colossal.....	10	1 00	3520—	Moses, ".....	19	2 00
3439—	Right and Left Ear.....	5	60	3521—	Nero, ".....	14	1 50
3440—	Mouth, from Statue of David.....	6	50	3522—	Niobe Daughter, ".....	13	1 00
3441—	Right Eye, from M. Angelo's David.....	7½	60	3523—	Nubian Girl, ".....	12	1 25
3442—	Nose, from M. Angelo's David.....	7½	60	3524—	Psyche of Naples, ".....	12	1 00
3443—	Left Eye, from M. Angelo's David.....	7½	60	3525—	Rafael Dorbino, ".....	13	1 25
3444—	Front view of Female Bust.....	12	1 50	3526—	St. Francis, ".....	14	1 25
3445—	Arms of Child crossed over breast.....	15	2 00	3527—	St. Jerome, ".....	16	2 00
3446—	Male Breast.....	21	2 50	3528—	Socrates, ".....	15	1 50
3447—	Side view of Torso of Hermes.....	24	3 00	3529—	Sophocles, ".....	15	1 50
3448—	Lower Extremities of Male, by M. Angelo.....	13	1 50	3530—	Spartacus, ".....	13½	1 50
3449—	Female Torso.....	18	2 00	3531—	Venus Arles, ".....	16	1 50
3450—	" ".....	21	3 00	3532—	" Bath, ".....	12	1 00
3451—	Illyssus' Torso.....	23	4 00	3533—	" Capitol, ".....	14	1 25
3452—	Back view of Male Torso.....	31	4 50	3534—	" Capua, ".....	14	1 25
3453—	Female Chest.....	14	3 00	3535—	" Cnidos, ".....	12	1 00
3454—	Narcissus, (mutilated statue).....	25	4 50	3536—	" Medici, ".....	12	1 00
3455—	Laocoon, (mutilated statue).....	21	2 50	3537—	" Milo, ".....	12	1 00
3456—	Theseus or Idaeian Hercules, (mutilated).....	28	6 00	3538—	" Thorwaldsen, ".....	13	1 00
3457—	Hercules Torso of the Belvidere, by Apollonius of Athens, in the Vatican, (mutilated).....	12	1 25	3539—	Voltaire, ".....	13	1 50
3458—	Genius of the Vatican, 'Centocelli' Cupid, Eros, (mutilated).....	40	12 00	3540—	Beethoven, Mask.....	9	1 00
3459—	Farnese Torso.....	19	4 00	3541—	Dante, ".....	8	1 00
3460—	Psyche Torso, at Naples.....	39	12 00	3542—	Brutus, ".....	22	3 50
3461—	Cherub, Floating in Air.....	12	1 50	3543—	Laocoon, ".....	14	1 25
3462—	" Balancing.....	14	2 50	3544—	Niobe, ".....	12	1 25
3463—	" Climbing.....	11	1 50	3545—	Zeus or Jupiter, Bust.....	22	3 50
3464—	Anatomical Foot of Horse.....	13	1 50	3546—	Lucius Verus, Mask.....	15	2 00
3465—	Head, showing Muscles of Face and Neck.....	18	3 00	3547—	Omphale, ".....	13	1 25
3465½—	Anatomical Bust.....	24	7 00	3548—	Dying Alexander, Mask.....	22	4 50
3466—	Anatomical Horse.....	13½	4 00	3549—	Apollo Belvidere, ".....	15	1 25
3467—	Bust showing layers of Muscles.....	26	7 50	3550—	St. Jerome, ".....	16	2 00
3468—	Anatomical Figure, by M. Angelo.....	10	1 75	3551—	Vitellius, ".....	15	1 50
3469—	" " of Human Body.....	40	9 00	3552—	Slave, by M. Angelo, ".....	15	2 00
3470—	" " ".....	72	50 00	3553—	Agrippa, ".....	18	2 50
3471—	Head of Child, (a).....	8	1 25	3554—	Myrina, relief.....	14½	1 75
3472—	Sleeping Cupid, Head.....	11½	1 50	3555—	Regulus, ".....	14½	2 00
				3556—	Alexander ".....	12	1 50
				3557—	Apollo ".....	11	1 50
				3558—	Dante, from Tomb at Ravenna, relief.....	19½	2 50
				3559—	Diana, relief.....	10½	1 50

No.	Name.	Height, in.	Price.	No.	Name.	Height, in.	Price.
3560	Caligula, relief.....	14	1 75	3645	Benivieni Head.....	Bust, 18	3 50
3561	Zacharias ".....	13½	1 75	3646	Boy Laughing.....	" 12	1 25
3562	Penelope ".....	13	1 75	3647	Boy, by Donatello.....	" 19	4 00
3563	Head of Female, relief from Trajan Column.....	9½	1 00	3648	Bourdalone.....	" 17	3 50
3564	Male Heads, relief from Trajan Column.....	12	1 00	3649	Brutus.....	" 22	5 00
3565	" Head.....	7	1 00	3650	Canova.....	" 26½	8 00
3566	" " " " ".....	8	1 00	3651	Cesar Julius.....	" 30	10 00
3567	" Heads, " " " " ".....	16	1 75	3652	" " " " ".....	" 27	7 00
3568	Head of Horse, " " " " ".....	8	75	3653	Christ.....	" 24	6 00
3569	Six Male Heads, " " " " ".....	14	1 75	3654	Cicero.....	" 30	10 00
3570	Four " " " " ".....	15	1 75	3655	" " " " ".....	" 27	7 00
3571	Male Head, relief from Trajan Column.....	9	1 00	3656	" " " " ".....	" 22	5 00
3572	" " " " " ".....	9	1 00	3657	Clytie.....	" 28	8 00
3573	" " " " " ".....	7½	75	3658	" " " " ".....	" 23	5 00
3574	" " " " " ".....	5	75	3659	" " " " ".....	" 17	3 50
3575	" " " " " ".....	6	75	3660	" " " " ".....	" 14	2 00
3576	" " " " " ".....	9	1 00	3661	" " " " ".....	" 10	1 00
3577	" " " " " ".....	8	1 00	3662	Cupid.....	" 17	3 50
3578	" " " " " ".....	7½	1 00	3663	" on pedestal.....	" 13	1 50
3579	" " " " " ".....	7½	1 00	3664	Dante.....	" 26	7 00
3580	" " " " " ".....	10	1 00	3665	" " " " ".....	" 16	3 00
3581	Head of Horse, relief from Trajan Column.....	11	1 00	3666	" " " " ".....	" 12	1 25
3582	Lion Shield, by Donatello.....	18	2 50	3667	Darwin.....	" 26	7 00
3583	Lion's Head.....	9	90	3668	David.....	" 53	35 00
3584	Head of Fox.....	8	1 75	3669	Demosthenes.....	" 27	8 00
3585	" Eagle.....	12	1 00	3670	" " " " ".....	" 22	5 00
3586	" Lioness.....	6	75	3671	" " " " ".....	" 15	2 50
3587	Bacchus Mask.....	14	1 50	3672	Diana, of Versailles.....	" 32	15 00
3588	Head of Lion, Antique.....	9½	1 25	3673	" " " " ".....	" 14	2 00
3589	Grotesque.....	4	40	3674	" " " " ".....	" 12	1 25
3590	Lion's Head.....	16	3 00	3675	Diomede.....	" 28	8 00
3591	Swimming Duck.....	19	2 00	3676	Eros.....	" 26	7 00
3592	Medusa Rondanini, relief.....	11½	1 25	3677	Euripides.....	" 27	8 00
3593	Grotesque.....	8½	75	3678	Faun.....	" 26	7 00
3593-1	Horses' Heads, by M. Angelo.....	4	25	3679	Fighting Gladiator.....	" 28	8 00
3594	Head of Bull.....	6½	75	3680	Il Fiammingo Boy.....	" 20	4 00
3595	" Wild Boar.....	11	1 75	3681	" " " " ".....	" 20	4 00
3596	" Elephant.....	9½	75	3682	Flora.....	" 14	2 00
3597	" Swine.....	4½	75	3683	Girl, by Donatello.....	" 19	4 00
3598	Ram's Head.....	18	6 00	3684	Head, with Wing.....	" 13	3 00
3599	Head of Kid.....	7	1 50	3685	Helena.....	" 27	7 00
3600	" Setter.....	5	75	3686	Hermes, Olympian.....	" 32	10 00
3601	" " " " ".....	5	75	3687	" " " " ".....	" 22	5 00
3602	" Ram.....	9½	1 00	3688	" " " " ".....	" 12	1 50
3603	" Lioness.....	13½	2 50	3689	Hero.....	" 30	8 00
3604	Lion's Head.....	18	4 00	3690	Hippocrates.....	" 27	7 00
3605	Head of Horse.....	6	75	3691	" " " " ".....	" 18	3 00
3606	" " " " ".....	9	75	3692	Homer.....	" 27	7 00
3607	" " " " ".....	6	75	3693	" " " " ".....	" 23	5 00
3608	" " " " ".....	6	75	3694	" " " " ".....	" 15	2 50
3609	" " " " ".....	12	1 50	3695	Horatius Flaccus.....	" 25	6 00
3610	" " " " ".....	22	6 00	3696	Isis.....	" 21	5 00
3611	" Dog.....	5½	75	3697	Juno Capitol.....	" 28	8 00
3612	" Goat.....	11	1 50	3698	" Barberini.....	" 40	20 00
3613	" Dog.....	5	75	3699	" " " " ".....	" 20	4 00
3614	" Ram.....	6½	75	3700	" Ludovisi.....	" 36	15 00
3615	" Dog.....	5	75	3701	" " " " ".....	" 14	2 00
3616	" Cat.....	5	75	3702	Jupiter, Otricoli.....	" 40	25 00
3617	" Fox.....	8	1 50	3703	" " " " ".....	" 23	5 00
3618	" Dog.....	5	75	3704	" " " " ".....	" 11	1 25
3619	" Donkey.....	6½	75	3705	Laocoon.....	" 27	7 00
3620	Eschylus.....	Bust, 27	8 00	3706	Leucothea.....	" 32	15 00
3621	Esculapius.....	" 23	5 00	3707	" " " " ".....	" 10½	1 00
3622	" " " " ".....	" 11	1 25	3708	Lucius Verus.....	" 40	25 00
3623	Agrippa.....	" 28	8 00	3709	Madonna, (Pietà).....	" 24	6 00
3624	Ajax.....	" 36	15 00	3710	Marcus Aurelius.....	" 30	10 00
3625	" " " " ".....	" 26	7 50	3711	Mark Antony.....	" 28	8 00
3626	" " " " ".....	" 12	1 50	3712	Mercury.....	" 30	8 00
3627	Amor.....	" 17	3 50	3713	Minerva.....	" 19	4 00
3628	Angelo, Michel.....	" 28	7 00	3714	" Giustiniani.....	" 32	12 00
3629	Antinous.....	" 27	8 00	3715	" " " " ".....	" 24	5 00
3630	Apollo.....	" 32	10 00	3716	" Medici.....	" 24	8 00
3631	" " " " ".....	" 23	5 00	3717	Medici, Giuliano de.....	" 24	5 00
3632	" " " " ".....	" 14	2 00	3718	" Lorenzo de.....	" 26	7 00
3633	" " " " ".....	" 12	1 25	3719	Moses.....	" 27	8 00
3634	Armadillo.....	" 29	8 00	3720	Nero.....	" 24	5 00
3635	" " " " ".....	" 12	1 25	3721	Niobe, Daughter.....	" 26	7 00
3636	" " " " ".....	" 10	1 00	3722	" Mother.....	" 32	15 00
3637	Aristotle.....	" 26	7 50	3723	" " " " ".....	" 11	1 25
3638	Aristotle.....	" 30	10 00	3724	Madonna of Nuremberg.....	" 19	5 00
3639	Augustus Caesar in Armor.....	" 32	12 00	3725	Omphale.....	" 20	5 00
3640	Augustus Youth.....	" 25	5 00	3726	Paris.....	" 27	7 00
3641	Bacchus.....	" 30	10 00	3727	Pericles.....	" 27	10 00
3642	" " " " ".....	" 12	1 25	3728	Plato.....	" 26	7 00
3643	" " " " ".....	" 10	1 00	3729	Psyche Naples.....	" 26	7 00
3644	" " " " ".....	" 12	1 25	3730	" " " " ".....	" 17	3 50
3645	" " " " ".....	" 10	1 00	3731	" on pedestal, Naples.....	" 13	1 50
3646	" " " " ".....	" 12	1 25	3732	Raphael.....	" 27	8 00

CLASSICAL STATUARY. BUSTS AND MODELS.

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No.	Name.	Height, in.	Price.	No.	Name.	Height, in.	Price.
3733	St. Bruno.....	Bust, 10	1 00	3818	Victory, by Rauch.....	37	12 00
3734	Seneca.....	" 26	8 00	3819	Menelaos and Patroelos, or Ajax and Achilles.....	24	7 50
3735	Socrates.....	" 27	7 00	3819-1	Menelaos and Patroelos, or Ajax and Achilles.....	16½	5 00
3736	".....	" 21	5 00	3820	Belt Bucklers.....	24	15 00
3737	Sophocles.....	" 27	8 00	3820-1	Pedestal for Belt Bucklers.....	13½	5 00
3738	Sphinx.....	" 24	8 00	3821	Victory, by Rauch.....	46	15 00
3739	Venus Akropolis.....	" 12	1 25	3822	Juliano de Medici.....	36	25 00
3740	" Arles.....	" 28	7 00	3823	Lorenzo de Medici.....	36	25 00
3741	" Canova.....	" 23	5 00	3824	Minerva.....	18	2 50
3742	".....	" 14	2 00	3825	Diano di Gabii.....	72	60 00
3743	" Capitol.....	" 31	9 00	3826	".....	28	7 50
3744	" Capua.....	" 32	10 00	3827	Mars.....	18	2 50
3745	" Cnidos.....	" 25	7 00	3828	Minerva, Pallas Giustiniani.....	90	75 00
3746	" De Medici.....	" 28	7 00	3829	".....	42	12 00
3747	" De Milo.....	" 34	10 00	3830	Hebe.....	62	35 00
3748	".....	" 16	3 00	3831	".....	36	10 00
3749	".....	" 14	2 00	3832	Ceres.....	44	14 00
3750	" Pergamon.....	" 18	4 00	3833	Venus, by Canova.....	69	60 00
3751	Venus Lucius.....	" 40	25 00	3834	".....	34	8 00
3752	Voltaire.....	" 27	8 00	3835	".....	23	4 00
3753	Youth, St. Peters.....	" 32	15 00	3836	Venus in Shell.....	18	5 50
3754	".....	" 20	5 00	3837	Venus Genitrix.....	72	60 00
3755	".....	" 10	1 50	3838	".....	28	7 50
3756	" Suppliant (Praying Boy).....	" 16	3 00	3839	Venus de Medici.....	63	35 00
3757	" of Tarent.....	" 16½	3 00	3840	".....	36	12 00
3758	Sheep.....	" 8½	2 75	3841	".....	30	10 00
3759	Lamb.....	" 12	3 50	3842	Venus, by Thorwaldsen.....	62	35 00
3760	Horse, standing.....	" 22	5 00	3843	".....	38	12 00
3761	".....	" 12	1 80	3844	Apollino de Medici.....	63	35 00
3762	" walking.....	" 12	1 80	3845	Venus Going to Bath, by Falconnet.....	32	10 00
3763	" running.....	" 14	4 00	3846	Crouching Venus.....	48	50 00
3764	" walking.....	" 13	4 00	3847	".....	17	5 00
3765	" prancing.....	" 14	3 50	3848	Venus Coming from Bath, by Allegrain.....	35	10 00
3766	Horses playing.....	" 15	5 00	3849	Greek Slave, by Powers.....	66	60 00
3767	".....	" 11	3 50	3850	".....	40	12 00
3768	Horse and Colt playing.....	" 13	6 00	3851	".....	19	3 00
3769	Camel.....	" 10	2 00	3852	".....	14½	1 50
3770	Eagle.....	" 16	5 00	3853	Venus de Milo.....	84	50 00
3771	Lion.....	" 15	4 00	3854	".....	42	12 00
3772	Cow.....	" 10½	3 00	3855	".....	34	9 00
3773	Bull.....	" 20½	6 00	3856	".....	23	4 50
3774	Pointer.....	" 5½	1 50	3857	".....	19	3 50
3775	Pug Dog.....	" 4	40	3858	Flora.....	42	12 00
3776	Cow with Calf.....	" 11	4 50	3859	Farnese Hercules.....	120	100 00
3777	Standing Setter.....	" 7	1 50	3860	".....	29	7 50
3778	Trotting ".....	" 7	1 50	3861	Arrotino, or Knife Grinder.....	72	60 00
3779	Pointer.....	" 8½	1 50	3862	".....	72	60 00
3780	Cupid reposing, by Thorwaldsen.....	" 6	2 50	3863	Germanicus (so-called), by Kleomenes.....	17	6 00
3781	Lion of Luzerne.....	" 11	4 00	3863-1	".....	32	7 50
3782	".....	" 4½	1 00	3864	Moses, by M. Angelo.....	36	25 00
3783	Ariadne and Panther, by Dannecker.....	" 21	10 00	3865	Psyche, by Canova.....	46	12 00
3784	".....	" 15	5 00	3866	".....	24	4 00
3785	Sleeping Ariadne, also called Cleopatra.....	" 17	7 50	3867	Erato.....	26	7 00
3786	Boy with Turtle, by Rude.....	" 14	4 00	3868	The Praying Boy, of the Berlin Museum.....	54	25 00
3787	" Goose, by Boëthos.....	" 36	25 00	3869	".....	31	7 00
3788	Thorn Extractor (Spinario), by Boëthos.....	" 36	25 00	3870	Faun, by Praxiteles.....	29	6 00
3789	".....	" 13½	3 25	3871	Antinous.....	72	75 00
3790	Bacchus and Ariadne, by Thorwaldsen.....	" 19	5 00	3872	".....	25	5 00
3791	Cupid and Psyche.....	" 18	5 00	3873	Piping Faun.....	60	30 00
3791-1	".....	" 28	9 00	3874	Borghese Achilles.....	88	85 00
3792	Niobe and Daughter.....	" 92	100 00	3875	".....	45	15 00
3793	".....	" 26	9 00	3876	Bacchus.....	60	30 00
3794	".....	" 21	6 50	3877	Slave, by M. Angelo.....	46	12 00
3795	Amor and Psyche, by Canova.....	" 28	10 00	3878	The Cyclop Polyphemus.....	17	3 00
3796	".....	" 13	3 00	3879	Jason (formerly called Cincinnatus).....	72	100 00
3797	Venus and Adonis.....	" 29	10 00	3880	".....	27	9 00
3798	Subpedestal for Venus and Adonis, by Canova.....	" 7	2 50	3881	Boxer, by Canova.....	48	16 00
3799	The Three Graces, by Canova.....	" 29	10 00	3882	Fighting Gladiator, or Borghese Gladiator, by Agasias.....	72	75 00
3798	Subpedestal for same.....	" 7	2 50	3883	Boxer, by Agasias.....	41	12 00
3800	The Three Graces, by Canova.....	" 21	6 00	3884	".....	34	10 00
3801	".....	" 12	2 50	3885	" by Canova.....	33	12 00
3802	Polyhymnia.....	" 45	20 00	3886	Mercury.....	15½	2 00
3803	Welcome.....	" 56	30 00	3887	Silenus and Infant Bacchus.....	48	15 00
3804	Enterpe.....	" 45	20 00	3888	".....	22	6 00
3805	Amor and Psyche, by Canova.....	" 20	12 00	3889	Mercury.....	63	40 00
3806	".....	" 16	8 00	3890	".....	22	5 00
3807	".....	" 13	5 00	3891	Hermes Carrying the Infant Dionysus, by Praxiteles.....	92	100 00
3808	Laocoon Group.....	" 72	100 00	3892	Hermes Carrying the Infant Dionysus, by Praxiteles.....	30	10 00
3809	".....	" 36	40 00	3893	Atlas bearing Globe.....	49	11 00
3810	Dancing Girl, by Canova.....	" 39	15 00	3894	The Clapping Faun, restored by M. Angelo.....	60	50 00
3811	Victory, by Rauch.....	" 38	1 00	3895	The Clapping Faun, restored by M. Angelo.....	34	6 00
3812	Terpsichore, by Canova.....	" 39	15 00				
3813	Hebe, by Thorwaldsen.....	" 60	30 00				
3814	".....	" 50	25 00				
3815	".....	" 25	4 50				
3816	Victory, by Rauch.....	" 44	20 00				
3817	Hebe, by Canova.....	" 42	15 00				

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A book of 162 quarto pages, containing illustrated essays on Manual Training and Industrial Education, Art Education, Drawing, Modeling, Clay Modeling, The Development of the Vase, Greek Pottery, Wood Carving, Original Composition, Grecian Mythology, Biographical and Mythological Notes, with 834 illustrations; besides describing 1068 Antique Statues and Busts, Models, Anatomical Studies, Parts of the Human Body from Nature, Conventional Leaf and Flower Forms, Vases, Architectural and Historical Ornaments, Animal Forms, etc., for Colleges, Schools, Academies of Design, Amateurs and Artists, also enumerated in List D. To add to its value as a book of reference, we have appended comprehensive notes, giving a general description of each Statue, name of Sculptor, when and where found, present place of original, mythological history, biographical sketches, etc. The elegant illustrations together with the text, make it a more valuable and complete book of reference for artists, designers, art students, or any person wishing to cultivate a taste for the beautiful, than any art book published. Will be mailed upon receipt of \$1.50, post paid, which we will credit on first order, making the book really free to customers.

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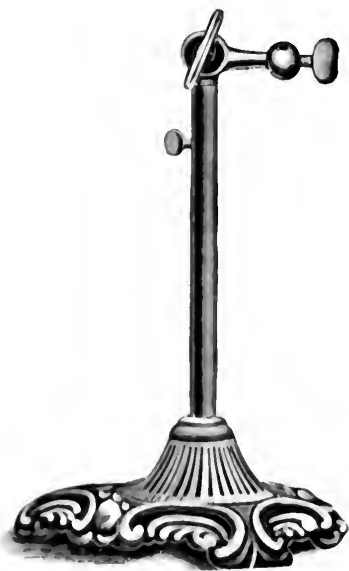
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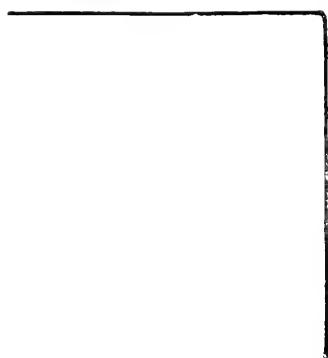
Hennecke Model Stand for holding wire models. Can be adapted to show the model in any position.

Height 13 in. Price, \$3.00.



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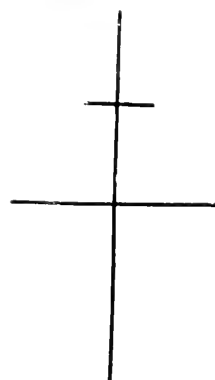
Stand showing wire model in position. Can change position at pleasure.



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Model for teaching the perspective drawing of the right angle.

12 in. long, 9½ in. wide. 25 cents.



No. 5004.

Model to assist in illustrating the perspective drawing of lines intersecting each other at right angles.

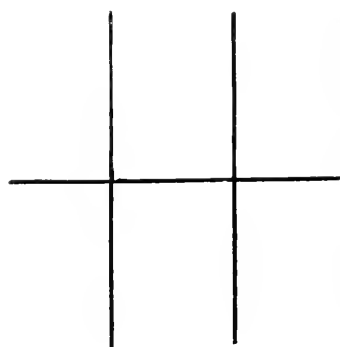
13½ in. long, 7½ in. wide. 50 cents.



No. 5002.

Model for teaching the perspective drawing of an acute angle.

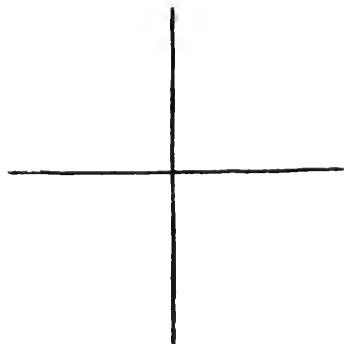
12 in. long, 4½ in. wide. 25 cents.



No. 5005.

Model for teaching the perspective drawing of lines intersecting each other at right angles.

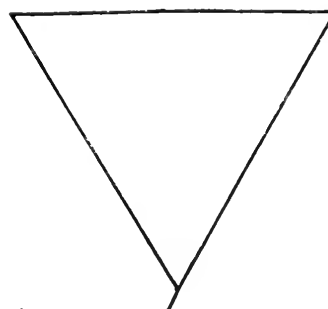
12 in. long, 12 in. wide. 60 cents.



No. 5003.

Model for teaching the perspective drawing of right angles.

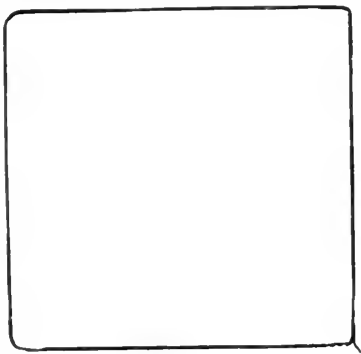
16 in. long, 16 in. wide. 50 cents.



No. 5006.

Model for teaching the perspective drawing of the equilateral triangular plane.

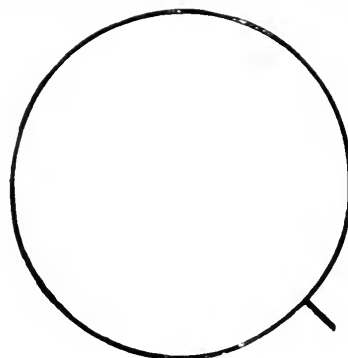
Sides, 12 in. 50 cts.



No. 5007.

Model for teaching the perspective drawing of the square plane.

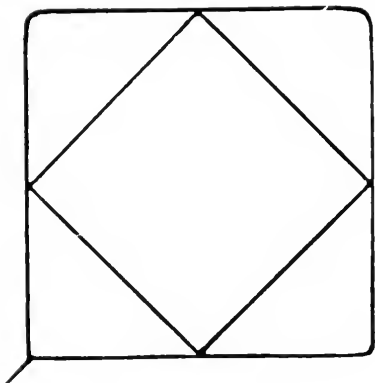
12 in. square. 50 cts.



No. 5010

This model is to assist in the demonstration of the principle that a circle seen in perspective appears as an ellipse; or, that a circular plane seen in perspective appears as an elliptical plane.

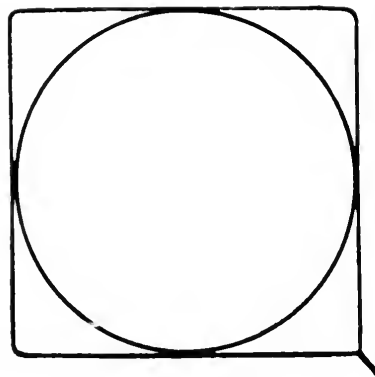
12 in. diam. 50 cts.



No. 5008.

Model for teaching the perspective drawing of inscribed square planes.

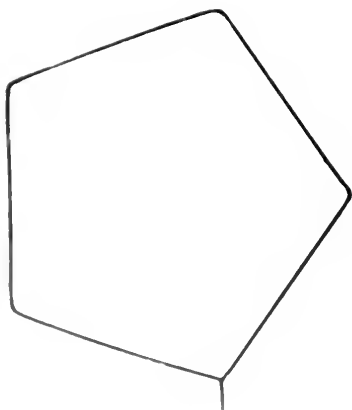
12 in. square. \$1.00.



No. 5011.

Model for teaching the perspective drawing of a circular plane inscribed in a square plane.

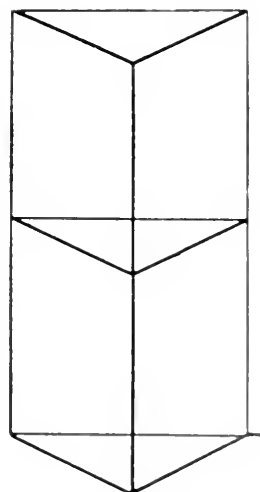
12 in square. \$1.00.



No. 5009

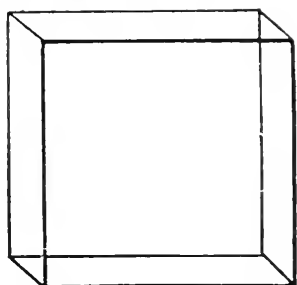
Model for teaching the perspective drawing of the pentagonal plane.

12 in. side. 50 cts.

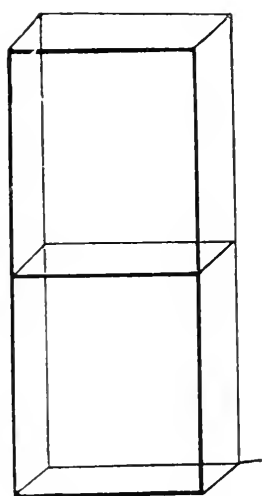


No. 5012.

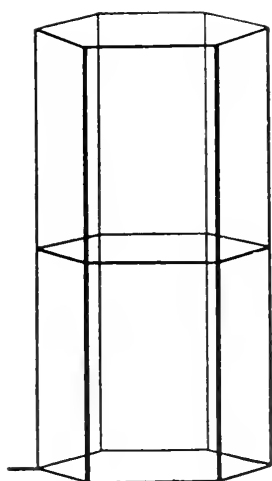
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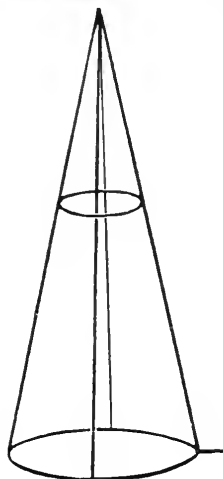
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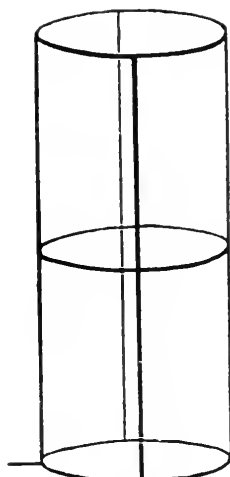
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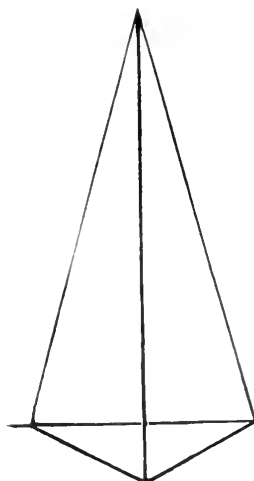
No. 5015.
SKELETON HEXAGONAL PRISM.
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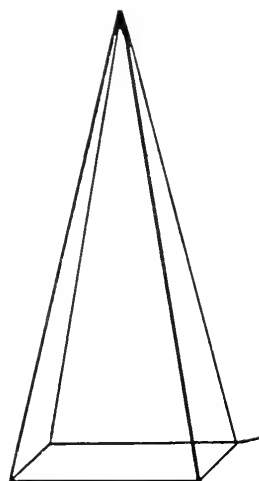
No. 5016.
SKELETON CONE.
This model can also be used to illustrate the drawing of the Truncated Cone.
16 in. high, diam. at base 8 in. \$2.00.



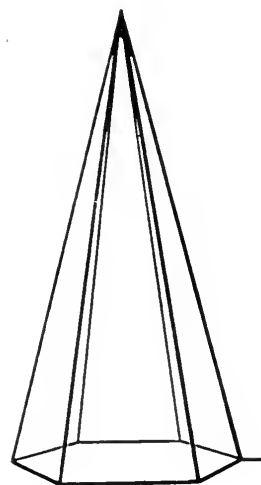
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SKELETON CYLINDER.
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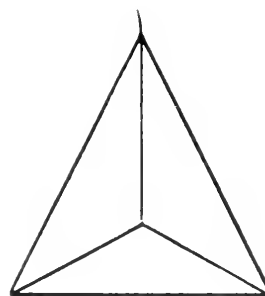
No. 5018.
SKELETON TRIANGULAR PYRAMID.
16 in. high, sides at base $8\frac{1}{2}$ in. \$1.50.



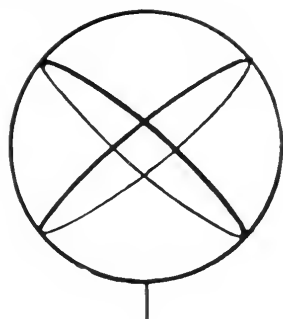
No. 5019.
SKELETON SQUARE PYRAMID.
16 in. high, 8 in. square at base. \$1.75.



No. 5020.
SKELETON HEXAGONAL PYRAMID.
16 in. high, sides $4\frac{1}{2}$ in. at base. \$2.00.



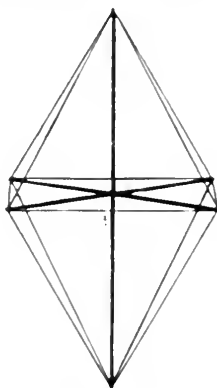
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SKELETON TETRAHEDRON.
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Skeleton Sphere with two great circles intersecting each other at right angles.

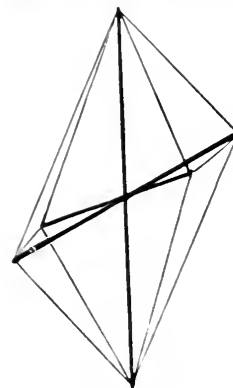
8 in. diam. \$1.75.



No. 5026.

SKELETON RIGHT RHOMBIC
OCTAHEDRON.

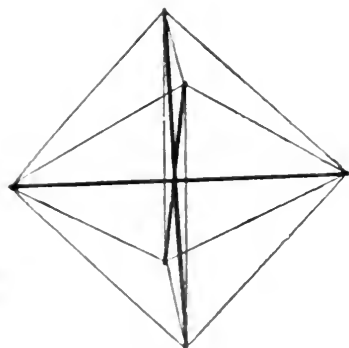
11 in. high, 10 in. long, 7 in. wide.
\$2.00.



No. 5028.

SKELETON OBLIQUE RHOMBOIDAL
OCTAHEDRON.

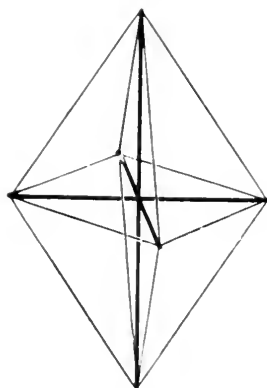
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\$2.00.



No. 5024.

SKELETON REGULAR OCTAHEDRON.

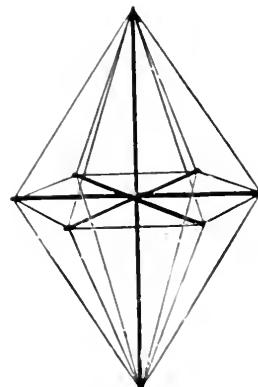
11 in. high, 11 in. wide. \$2.00.



No. 5027.

SKELETON OBLIQUE RHOMBIC
OCTAHEDRON.

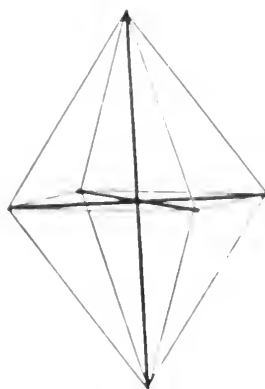
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14 in. high, 9½ in. wide. \$2.50.



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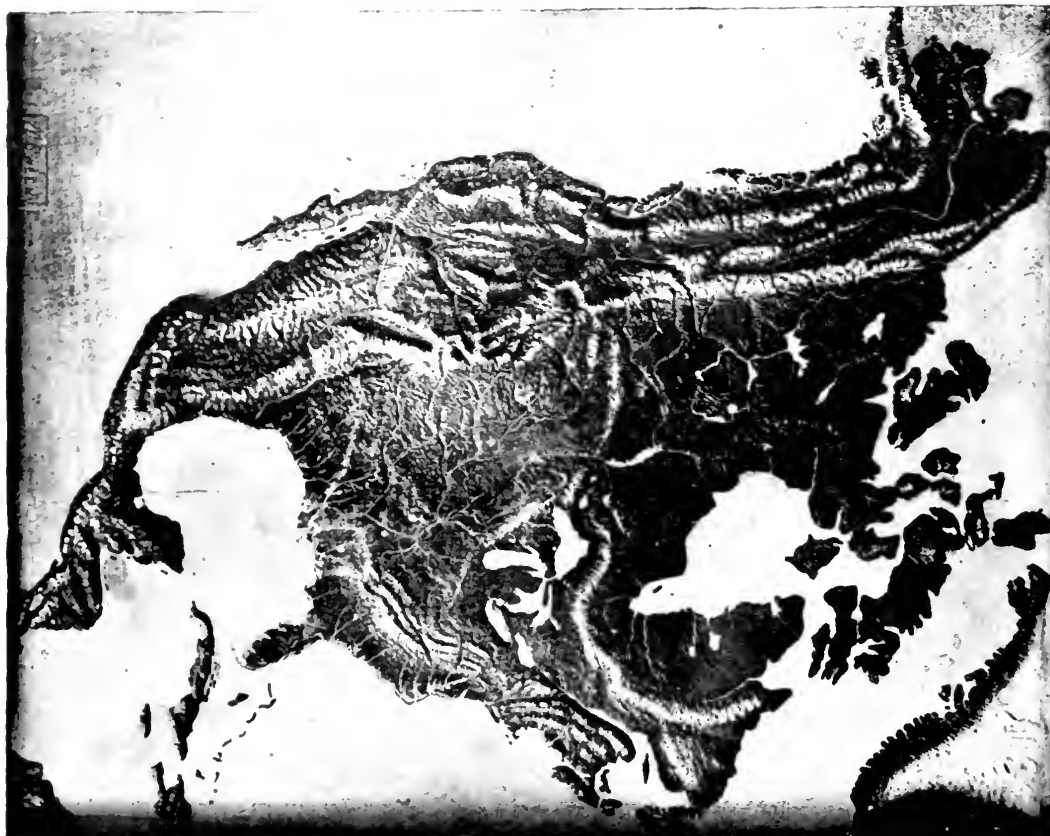
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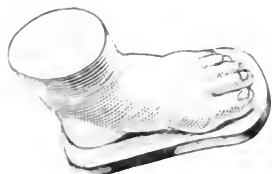
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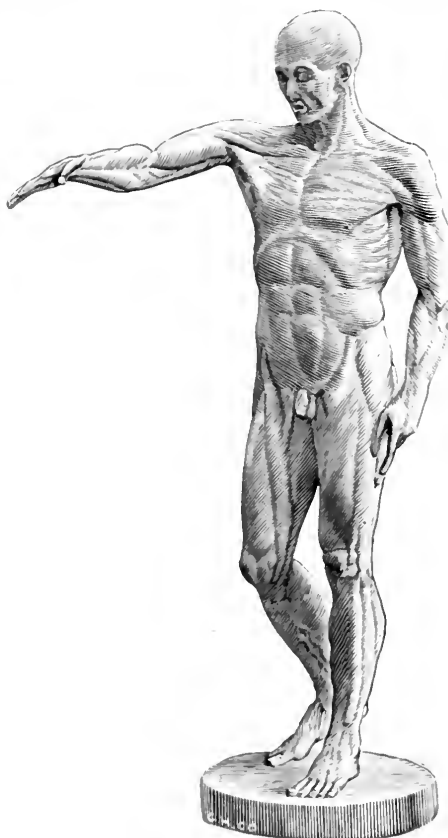
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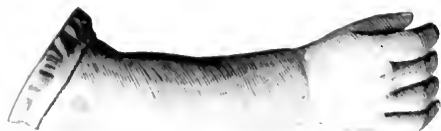
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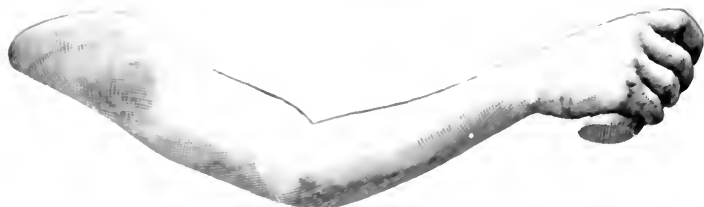
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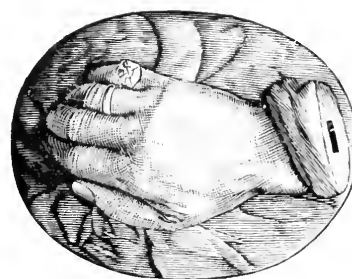
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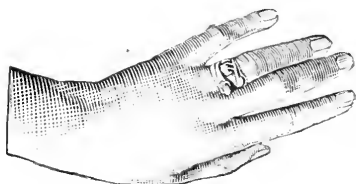


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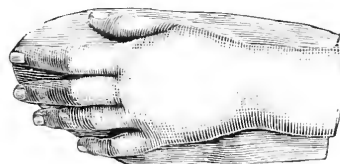
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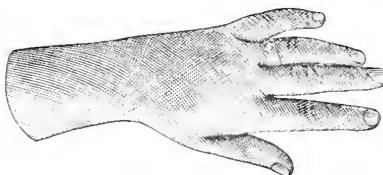
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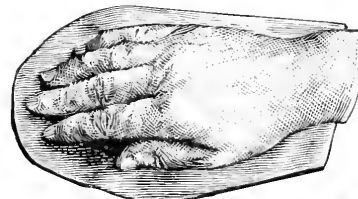
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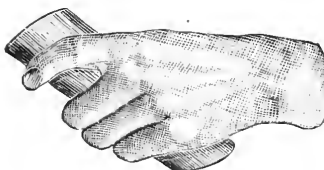
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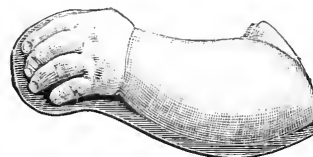
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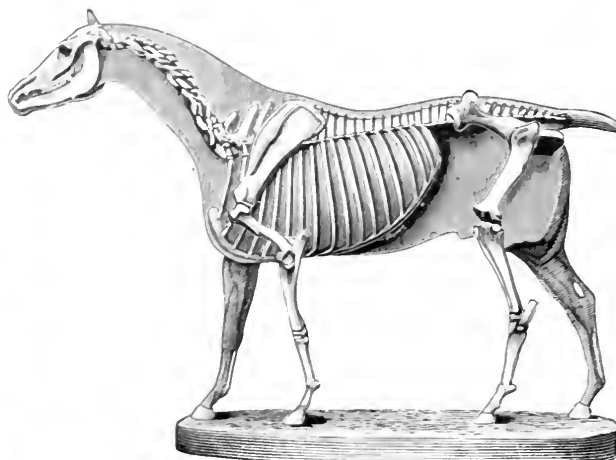
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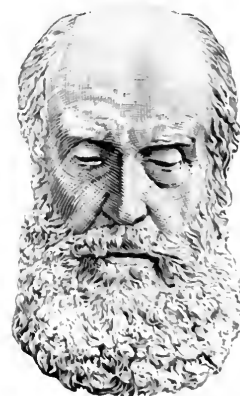


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3531—Venus Arles, "	16 1.50	3557— "	12 1.25
3532— "	12 1.00	3558— "	10 1.25
3533— "	14 1.25	3559— "	8 1.00
3534— "	14 1.25	3560— "	11 1.25
3535— "	12 1.00	3561— "	10 1.25
3536— "	12 1.00	3562— "	11 1.25
3537— "	13 1.00	3563— "	15 1.50
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